COMMERCE

MAGAZINE

MAY, 1949

25 CENTS

Illinois U Library

U. S. Steel Corp. Photo

About 30 per cent of all industrial workers are employed in producing capital equipment

AS CAPITAL EXPENDITURES GO, SO GOES PROSPERITY — See Page 23

RELAXATION is what Counts!

especially so with the modern

PRODUCTION DRIVE!

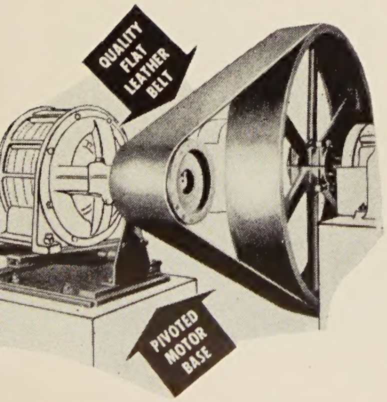
The experienced basket ball coach keeps up the exciting and swift action of this national sport with frequent player substitutions.

After a short period of playing a player is withdrawn from the game and returns to the bench. The men on the bench then relax and rest their tired bodies and frayed nerves from the continuous running action, quick passing and "shooting for the basket."

These frequent substitutions give the players the opportunity to rest up. It is these moments of "RELAXATION" that enables the players to regain their strength and continue the game to the final whistle at top efficiency.

The same is true of the Production Drive. This short center flat leather belt drive with a pivoted motor base gives INSTANTANEOUS compensation in belt tension for changes in the load. The leather belt "leans" into the heavy loads with greater tension but when the load is normal, the belt "relaxes" and carries the load with ease, ready for the next peak load.

Leather belts can "relax" because of the natural self-adjusting resiliency of leather not found in any substitute material — resulting in full-friction pulley grip, shock absorbing ability, operating stamina and LONGER LIFE.



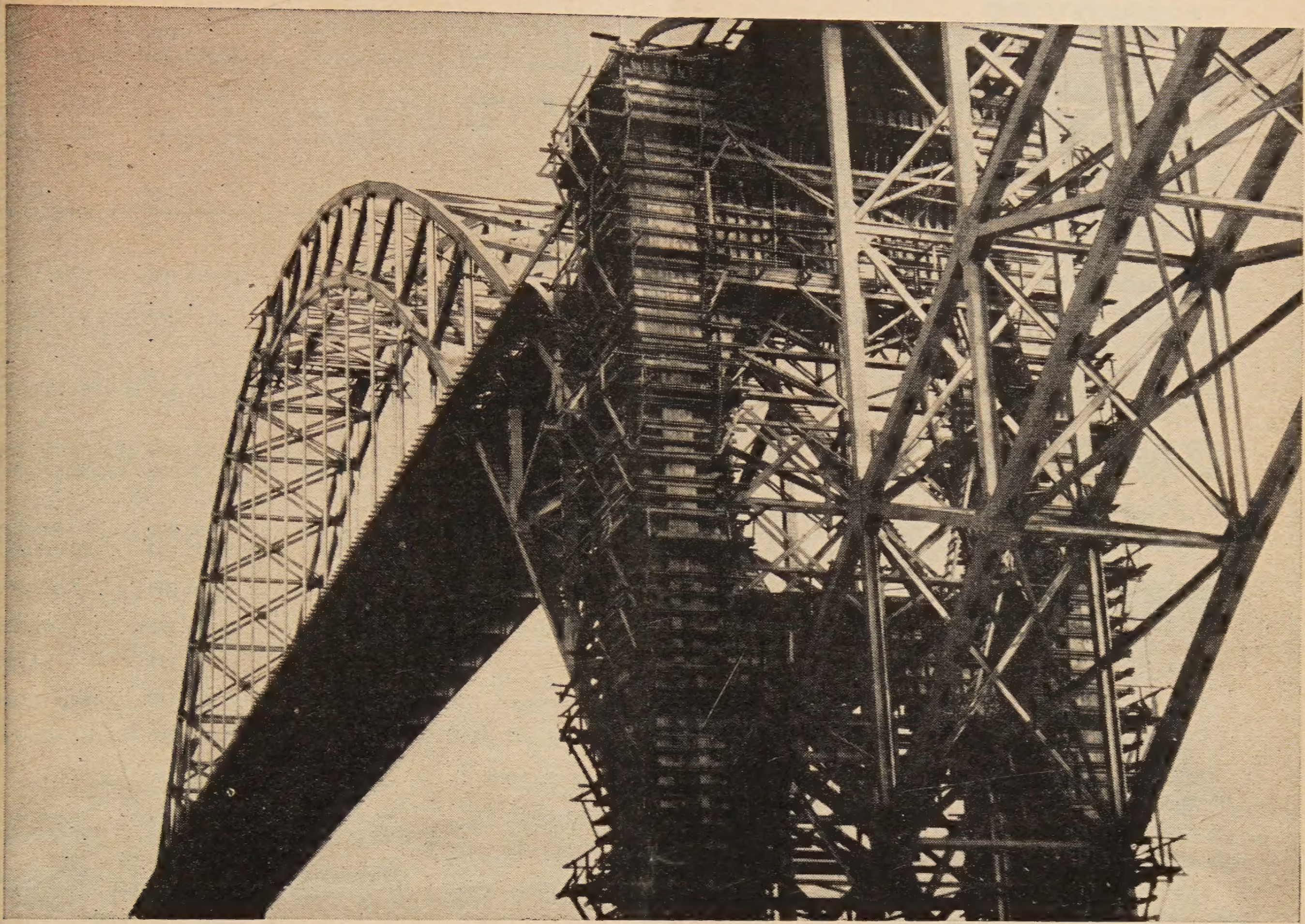
DON'T WAIT—INVESTIGATE NOW!

THE MANY ADVANTAGES OF THIS LATEST TYPE DRIVE TEAMED UP WITH CHICAGO BELTING BEFORE DECIDING ON ANY TYPE DRIVE!

Phone Monroe 6-5050 and Talk It Over With One of Our Sal
Engineers

CHICAGO BELTING COMPAN
MANUFACTURERS OF LEATHER BELTING AND LEATHER PACKING
GREEN & WASHINGTON STREETS, CHICAGO

Cross a bridge and make a wish —this wish:



NEXT TIME you save ten or twenty or fifty miles of driving by taking the short way over a bridge — give a thought to the days when the bridge wasn't there, when people *had* to take the long way around.

Right then would be a good time to make your wish . . . a wish that America will always have engineers able to plan and build these amazing structures, and public officials with imagination to foresee the public need.

And right then, too, would be a good time to be glad that America produces more *steel* than any other country in the world.

Brains and steel. These are two vital ingredients for building a better America. If you could visit all parts of the nation today, you'd see steel being used to build literally hundreds of bridges. Many of them are projects that have been waiting since before the war.

But the call for steel goes up from dozens of other quarters, too. Nothing else can take its place. Steel for housing . . . for sewage disposal plants . . . for automobiles . . . for roads . . . for badly needed railroad equipment. Never before has there been such constructive need for steel.

United States Steel plants are working at top capacity to do their full part in meeting this unprecedented demand. And the 900 million dollar United States Steel improvement program currently going forward is adding still more steel-making capacity to serve the nation. Scientists in United States Steel research laboratories continue their work of creating better, stronger steels—so as to make every ton give the utmost service.

Helping to build a better America is the number-one job of United States Steel.

This label is your guide to quality Steel.

MANUFACTURED FROM USS TRADE MARK STEEL UNITED STATES STEEL

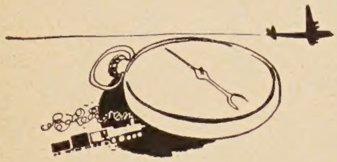
UNITED STATES STEEL CORPORATION SUBSIDIARIES

UNITED STATES STEEL

USS *Helping to Build a Better America*

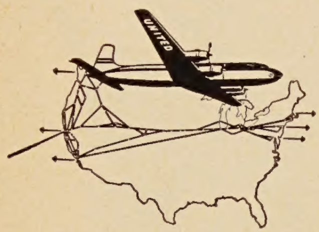
Listen to . . . The Theatre Guild on the Air, *presented every Sunday evening by United States Steel. American Broadcasting Co., coast-to-coast network. Consult your newspaper for time and station.*

SPEED TURNOVER



. . . get products out of slow-moving, unprofitable "pipe-lines." Speed sales, increase profits

by using UNITED AIR FREIGHT!



United offers an unequalled domestic route and extensive interline connections, enabling you to ship from nearly any-where to major marketing areas all over the world.

United's 4-Engine, 9-ton-capacity Cargoliners speed your shipments coast to coast overnight; serve the cities *you* sell in with fast, frequent schedules. United passenger planes carry freight, too.

United World Air Cargo makes shipping overseas fast, easy and inexpensive.

United's low rates allow you to sell more, *save* more, with United Air Freight. Call your United office or write:

UNITED AIR LINES

Cargo Sales Division, 5959 S. Cicero Ave., Chicago 38, Illinois.

STATISTICS OF CHICAGO BUSINESS

	March, 1949	February 1949	March 1948
Building permits	625	206	399
Cost	$10,030,900	$8,067,500	$8,025,100
Contracts awarded on building projects			
Cook Co.	1,090	458	1,333
Cost	$29,604,000	$22,128,000	$42,040,000
(F. W. Dodge Corp.)			
Real estate transfers	4,920	4,059	5,649
Consideration	$5,118,999	$3,830,550	$8,834,541
Retailers' Occupation Tax collection, Cook Co.	$7,165,046	$7,245,498	$7,171,534
Department store sales index (Federal Reserve Board) (Daily average 1935-39=100)	199.7[1]	183.4	221.6
Bank clearings	$ 3,164,113,193	$ 2,738,281,112	$ 3,253,373,877
Bank debits to individual accounts:			
7th Federal Reserve District	$17,158,195,000	$13,386,293,000	$16,934,656,000
Chicago only	$9,278,165,000	$6,779,890,000	$9,325,877,000
Chicago Stock Exchange transactions:			
Number of shares	550,000	558,000	566,000
Market value of shares traded	$13,751,713	$12,965,140	$15,827,891
Railway express shipments, Chicago area	1,401,876	1,301,263	1,914,469
Air express shipments, Chicago area	38,347	41,780	61,026
L. C. L. merchandise cars	26,569	22,371	30,755
Originating local telephone messages	179,015,396	161,868,519	181,237,508
Electric power production, kwh.	1,072,083,000	995,011,000	1,015,564,000
Revenue passengers carried by Chicago Transit Authority lines:			
Surface Division	66,228,223	60,160,304	75,189,841
Rapid Transit Division	14,881,336	13,530,445	16,658,815
Postal receipts	$10,249,766	$8,489,734	$9,003,532
Air passengers:			
Arrivals	103,665	76,986	78,556
Departures	106,002	81,650	78,010
Consumers' Price Index (1935-39=100)	174.5	172.9	169.0
Livestock slaughtered under federal inspection	511,378	485,817	418,118
Families on relief rolls:			
Cook County	23,419	21,533	18,702
Other Illinois counties	19,807	18,965	16,895

[1]—Preliminary figures.

JUNE, 1949, TAX CALENDAR

Date Due	Tax	Returnable to
15	Employers who withheld more than $100 during previous month pay amount withheld to	Authorized Depositary
15	Payment of one-quarter of 1949 estimated tax found due March 15 by individuals. (Those required to file declaration for first time, or making revised declaration, pay one-third of the balance of 1949 estimated tax)	Collector of Internal Revenue
15	Illinois Retailers' Occupation Tax return and payment for month of May	Director of Revenue
15	Second quarterly installment of 1948 Federal Income Tax by Corporations and Fiduciaries	Collector of Internal Revenue
15	Payment of Federal Income Tax withheld at source	Collector of Internal Revenue
30	Federal Excise Tax return and payment due for May, 1949	Collector of Internal Revenue

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In This Issue . . .

There has been a scattering of newspaper reports lately telling of laboratory workers who suffered ill-effects from atomic radiation. How serious is the problem of atomic radiation? Not as serious as many current rumors would have one believe, but, reports Georg Mann (p. 13), sufficiently serious to warrant the attention of many of our leading physicists and physicians.

When a department store advertises bathing suits on sale tomorrow, its best-laid plans are likely to go awry if the day dawns rainy and cold. So now, some department stores are turning to specialized weather forecasters to help them plan sales in advance . . . on days when the weather will help move merchandise. This is only one phase of the specialized weather forecaster's job; he is also helping factory managers plan production and construction engineers plan next week's work, as Joe Egelhof reports on page 16.

The average businessman is likely to hear a great deal about "Point Four" in the months ahead. The expression refers to Mr. Truman's proposal that the United States undertake a "bold" new program to help develop backward areas of the globe. The President wants to encourage American capital investment abroad, but first he wants to export a great deal of American know-how in order that foreign nations will use the capital to their own advantage and to the advantage of potential American investors. The issue is a controversial one, likely to produce many an argument in and out of government. Joseph Raymond reports the highlights—p. 15.

If you still think of glue as the by-product of Ol' Dobbin's hoofs, you have a surprise coming. Synthetic adhesives are booming into tremendous industrial importance. They hold metals, glass and a number of other hard-to-stick items together firmer and longer. They are also paving the way for a host of new products as John McWethy, Chicago bureau manager of the WALL STREET JOURNAL, reports on page 18.

One of a series of advertisements showing the benefits of futures trading on the Chicago Mercantile Exchange.

ONE LAW

that's never changed in a free country

The Inquiring Reporter

asks both pertinent and impertinent questions at the Chicago Mercantile Exchange, and gets a free course in "supply and demand."

"What's all this talk about Commodity Exchanges being responsible for the prices of foods?" I asked a serious-faced broker. "Anything to it?"

"Sit down, son," he said. "Let's see what you've got on your mind. Now what is it that you want to know?"

"Well, I'm trying to get at the net of this food price question," I told him. "Seems like everybody is always complaining about prices. First they are too high and the public hollers. A few years back, they were too low, and the farmer cried. Do you fellows set the prices on butter, eggs, onions and apples over here?"

"We don't have any more to do with it than whether it will rain tonight or not."

"That so? A lot of people seem to think you do. Then who does decide how much eggs will be worth next October, or butter next November?"

"Nobody. Everybody!" he replied. "Ever hear of the law of supply and demand? The law that's never changed in a free country? It's the law of supply and demand that makes prices go up and down!"

"Sounds like an evasive answer to me," I said. "Who interprets that law?"

"I'll show you. Come with me," and walked me onto the floor of the Exchange. There were brokers all over the place — it was busy as a bee-hive. He took me over to a news ticker.

"Here's where the news comes in," he said. "These brokers and their customers analyze every turn of events. There are a thousand things that influence how many eggs and how much butter will be produced, and how much the public will consume.

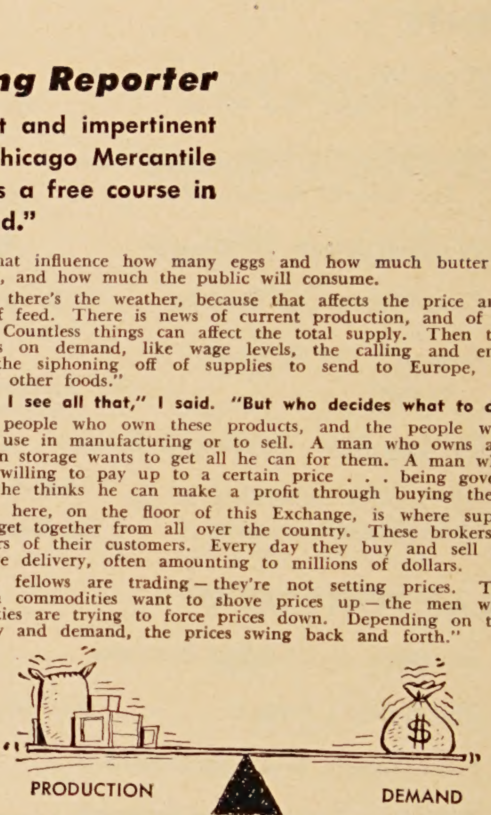
"First, there's the weather, because that affects the price and availability of feed. There is news of current production, and of foods in storage. Countless things can affect the total supply. Then there are influences on demand, like wage levels, the calling and ending of strikes, the siphoning off of supplies to send to Europe, and the prices of other foods."

"Sure, I see all that," I said. "But who decides what to do?"

"The people who own these products, and the people who want them to use in manufacturing or to sell. A man who owns a carload of eggs in storage wants to get all he can for them. A man who needs them is willing to pay up to a certain price . . . being governed by whether he thinks he can make a profit through buying them.

"Right here, on the floor of this Exchange, is where supply and demand get together from all over the country. These brokers execute the orders of their customers. Every day they buy and sell contracts for future delivery, often amounting to millions of dollars.

"These fellows are trading — they're not setting prices. The men who own commodities want to shove prices up — the men who need commodities are trying to force prices down. Depending on the news of supply and demand, the prices swing back and forth."



"Dog gone! I begin to see this now. When supplies get short and prices go up, farmers begin to produce more because they can make money at it. Then that extra supply brings prices down, and that slows production. So production controls prices, and prices control production."

"Now you've got it! And that's true of every kind of manufactured goods as well as commodities. It's our American way of doing things — our national incentive system."

The Inquiring Reporter

Why we have BUTTER, EGGS and other commodities when AMERICA NEEDS THEM
An explanation of FUTURE TRADING on THE CHICAGO MERCANTILE EXCHANGE

FREE—**Send for our new booklet,** "Why We Have Butter, Eggs and Other Commodities When America Needs Them," which explains how the Chicago Mercantile Exchange functions and renders a service to the nation. ☐ **Check if wanted.**

✓ For specific information on trading in commodities, such as contracts and specifications, please check those you are interested in. ☐ **Apples** ☐ **Butter** ☐ **Eggs** ☐ **Onions**

CM5

CHICAGO MERCANTILE EXCHANGE
110 North Franklin Street Chicago 6, Illinois

THE NATION'S MARKET PLACE FOR EGGS, BUTTER AND OTHER COMMODITIES

The Editor's Page

Needed—Union Statesmanship

THE SEASON for the opening of wage negotiations in the big, pattern-setting industries, including automobiles, steel, coal and electrical equipment, has arrived just when a broad economic readjustment is in progress. Prices are declining, unemployment has increased, and there has been a shortening of the work week in many factories. The cost of living has been, and still is, declining. This decline deprives labor negotiators of their strongest single argument for a boost in wages, the argument that was so effective in the first three rounds.

With these conditions prevailing, the union leaders have an opportunity to display real economic statesmanship. They can help keep the present readjustment within safe bounds by not attempting to force an increase in costs at the very time consumers are forcing a reduction in prices. Or, if they choose to push wage costs higher by drastic increases in rates or so-called fringe benefits, they can impede the present readjustment and perhaps turn it into an economic rout.

Advance indications are that the unions' demands will be big in keeping with their traditional bargaining strategy of beginning negotiations with a lot of leeway. What they will settle for, however, may be another thing. It is to be hoped that it will be. No one, least of all the unions' wage earning members, will be helped by any concessions that boost production costs at the present critical juncture.

As Others See Us

A SIXTEEN man group of British foundrymen who are visiting this country to study industrial methods have hit on two factors that they believe make for American success. The group's spokesman said:

"People in the United States are so gadget minded they won't work long at a job without trying to rig up a gadget to speed up the job or do part of it for them. That applies to your homes as well as your factories — your motorized lawn mowers, for example." The second factor cited was the American worker's "state of mind", which the British foundrymen described as a "willingness to accept new ideas and methods."

In Americanese the word gadgets is applied to rather insignificant things. But disregarding the question of semantics our English visitors paid us a compliment of a high order. Let's hope we remain a "gadget minded" and open minded people. The two qualities seem to pay big standard of living dividends that people from other nations come a long way to study.

Securities and Education

DEVELOPING a broad public understanding and market for equity securities of American industry is a project that far more has been said than done about. Meanwhile the market has languished as has the business of investment bankers and brokers.

Recently three securities firms have attacked the problem in novel ways. Cooley and Company of Hartford took a booth at a local home exposition to display its wares. It did just that, displaying securities certificates, telling how they were bought and sold and explaining the role of the investment broker and stock exchanges in providing business with capital. Results were some new customers and the discovery of a number of sadly uninformed people. Prescott and Company of Cleveland devised another new technique for a financial house. It arranged with an industrial company to tell about its stocks and how to buy them in the company's employe magazine. Prescott followed up by mailing a primer on securities to the employes' homes. The third innovation is a radio series on the stock market in Italian on a New York station by Gruntal and Company.

More experiments such as these in education and promotion by the banking fraternity could have far reaching, beneficial results.

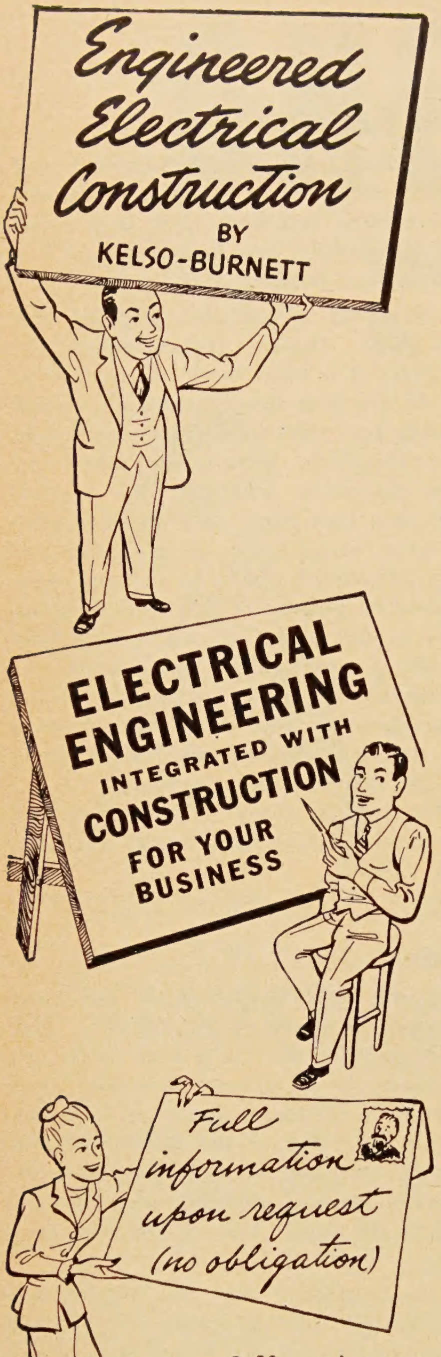
Tax Awakening

SIGNS are increasing that taxpayers at the local level are beginning to weary of the burden. The disturbance in Chicago over the latest real estate tax increase is illustrative. It is strange, however, that the biggest fuss seems to be made about the smallest part of the total tax bill. Out of the $63,000,000,000 that is expected to be collected in taxes this year, the states and local governments of all kinds will together collect only about 25 per cent. The 75 per cent take goes to Uncle Sam.

Logic would seem to dictate that the biggest bill would be the one to get excited about first. Uncle Sam alone is taking between 18 and 19 per cent of the national income for his million and one spending purposes. Evidently the local governments are bearing the brunt of the pressure for two reasons: one, proximity and, two, the mistaken belief so many people hold that Uncle Sam gets most of his money from the rich.

It is encouraging, however, that tax consciousness is beginning to develop. In due course, the effects of the awakening may be felt in Washington where the chips read in billions and where the most good undoubtedly could be done in eliminating both sheer waste and spending for luxury services.

Alan Study



● You gain many advantages . . . . ONE RESPONSIBILITY, ONE RELIABLE FIRM — to handle modernizations, conversions, new construction from design through engineering to completed construction. We work with your engineering firm, general contractors — or direct. Write us today.

KELSO-BURNETT ELECTRIC COMPANY

223 WEST
JACKSON
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K·B
SERVING
INDUSTRY
SINCE 1908

CHICAGO 6,
ILLINOIS

HERE-THERE and EVERYWHERE

• **Eyes Front, Motorists!**—Although television has been experimentally installed in at least one Chicago taxicab, Motorola, Inc., which made the test installation, is "firmly opposed" to the introduction of TV on the average motorist's dashboard. The radio-TV manufacturer reports that television installation in private cars is "entirely feasible," but after a safety check-up it is now recommending that future sets be installed only for rear-seat passengers.

• **Competitive Truce?**—"Big Steel's" warehousing subsidiary, the United States Steel Supply Company, will henceforth handle a complete line of aluminum mill and building products, according to an announcement by Leslie B. Worthington, president. U.S. steel says the distribution of aluminum "is evidence of our desire to satisfy more fully the metal requirements of our customers."

• **Retail Sales Boosters** — The Wall Street Journal notes that department stores have begun dreaming up some unique promotional ideas to pep up lagging sales. In Cleveland, the May Company gives a free pair of gloves to any woman customer whose hand fits a "Cinderella" mold, while in Pittsburgh a women's shop plugs "White Satin" perfume by blowing perfume-laden bubbles onto passersby from a large atomizer over the entrance.

• **Boosting Dollar Reserves**—Gabon, a French African province familiar to collectors for its colorful postage stamps, will begin sending some 2,000,000 feet of lumber a month to this country next Fall under an agreement made by the United States Plywood Corporation. The export volume will represent about 20 per cent of the output of the world's largest hardwood plywood mill, now nearing completion at Port Gentil on the Ogooue River in Gabon Province.

• **Piercing Photographs** — X-ray pictures may be made through steel 10 inches thick with a new 10,000,000-volt mobile betatron which has been installed at the White Oak (Md.) Naval Ordnance Laboratory by the General Electric Company. The magnet of the new betatron utilizes special alloy steel, built up of sheets four thousands of an inch thick. The entire unit weighs 5,000 pounds and is suspended from a crane.

• **Switch to Tea?** — The international tea industry, including growers, packers and distributors, is about to launch its first big United States promotion campaign, reports the U. S. Tea Association. The campaign, to cost $1,000,000 a year at first and later $2,500,000 annually, will attempt to reverse a 75-year trend toward lower tea consumption in this country.

• **Aircraft Snap-Back** — Aircraft manufacturers are rapidly coming out of the lean period they experienced in the years immediately after the war. With defense expenditures up, industry reports now indicate that the order backlogs of west coast aircraft plants have risen 40 per cent in the last twelve months. Employment in these plants is also up about 14 per cent over the first half of 1948.

• **Holiday Increase?** — The Associated Industries of Cleveland, which keeps tab on expected labor demands in that area, reports that a number of unions will ask Cleveland employers for additional paid holidays during forthcoming negotiations. Prominently mentioned by union negotiators are five specific holidays to be added to the six now generally recognized in the

(Continued on page 49)

BURN ECONOMICAL HEAVY OIL

with the

HIGHLY EFFICIENT

IRON FIREMAN

INDUSTRIAL

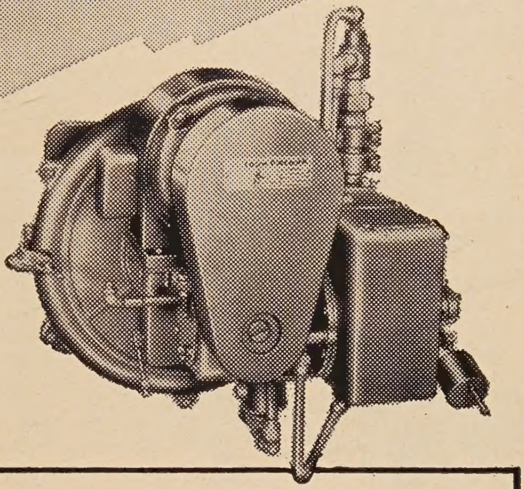
OIL BURNER

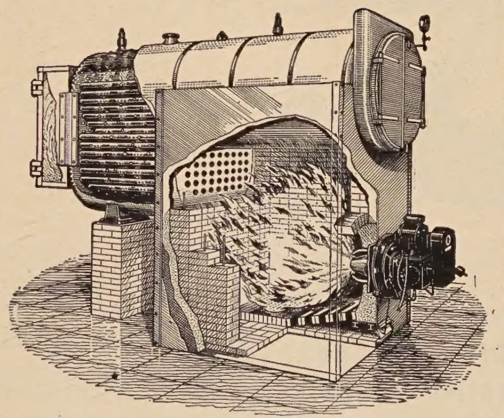
Now you can use economical heavy oils (Nos. 5 and 6) with the Iron Fireman Industrial Oil Burner and get a steady, even flame, regardless of varying oil temperature or viscosity. This steady flame eliminates erratic heating and starting failures, and it *stays* steady, even at very low burning rates.

New Principle of Oil Control

Iron Fireman's exclusive Oil Volumeter employs a new principle of oil control which eliminates the inefficient combustion and many troubles that go with conventional controls. Oil flow control with the Oil Volumeter is positive and precise because the oil feed-rate is regulated *by volume*, instead of using complex mechanisms (as some burners do) to preheat the oil or change the size of the opening through which oil flows.

The result of the Oil Volumeter's exact control is efficient, non-pulsating combustion, which has enabled the Iron Fireman Industrial Oil Burner to make an enviable record of fuel and labor savings in many installations throughout the nation.





●

Write or phone today to find out how the Iron Fireman Industrial Oil burner can save fuel and labor costs for you.

THE IRON FIREMAN
TRADE MARK
REG. U. S. PAT. OFF.

IRON FIREMAN MFG. CO.

1101 W. Adams St.
MOnroe 6-8000

DON'T LET THIS HAPPEN TO YOU!

YEAH, WE HAVE A LOT OF THEM— WE HAVEN'T SOLD ONE IN OVER 3 MONTHS!
You can Avoid

Embarrassing moments like this by demanding the intercommunication system that gives you complete telephone privacy . . .

The STROMBERG-CARLSON Executive System

For complete details before you buy any intercommunication system, fill in the coupon or clip to your business letterhead and mail today. There is no obligation.

TRI-PAR SOUND SYSTEMS
128 N. FRANKLIN ST. CHICAGO 6, ILL.

Please send me information on the Stromberg-Carlson Executive System.

Name____________________

Company____________________

Address____________________

City____________ State______

Trends in FINANCE and BUSINES

How Fast Can You Spend A Million Dollars?

It's practically impossible nowadays for anyone to grasp the significance of "a billion dollars," let alone the multi-billion dollar federal budgets that are discussed like pocket change in Washington. Well, says the Northwestern National Life Insurance Company, there's one way to comprehend the extraordinary amount of money that moves in and out of the United States Treasury:

A century ago it took the government nine days to spend a million dollars; today, it sails through a mere million every 12 minutes. Of course, everything is speeding up these days, the insurance company reflects. We have learned how to travel about 25 times as fast as in 1850; but even this transportation speed-up dwindles in significance when it noted that the government has learned how to spend tax money 1,100 faster in the same 100 years.

« « » »

Underwriters Ease Rules On Air Travel

Life insurance has become considerably less expensive for those who travel regularly by commercial airline, either as passengers or crew members. An Institute of Life Insurance survey of 100 life companies reveals that 93 companies now insure pilots and crews on scheduled U. S. airlines and 80 will insure company personnel on non-scheduled domestic flights. Only six companies either reject such applicants outright or exclude the air risk; the rest consider each insurance application in this category individually.

The Institute notes that with this relaxation of air risk limitations, most insurance companies have increased policy limits for scheduled U. S. airline pilots to $25,000 two and a half times the 193 limit. Also, the customary extr premium per $1,000 has droppe from $25 in 1935 to $3 today. Th same $25,000 limit is usually ex tended also to pilots and crews c non-scheduled domestic lines, bu the extra premium per $1000 i these cases averages $5.

Increased air safety has brough a liberalization in underwritin policy on airline passengers. O the 100 companies surveyed; 9 now accept such applicants at standard rates; 83 of these have no special limitations and among the remaining 12, the most common lim itation is an expected 250 hour of flying annually. In 1935, th life companies regarded air trave with considerably less enthusiasm Then, only six companies accepted passengers of scheduled U. S. lines at standard rates without limitation; ten companies rejected such applicants outright or issued policies excluding the air risk if flying was extensive.

« « » »

Wage Rates Rise Twice As Fast As Clothing Prices

National Industrial Conference Board statisticians who have been exploring another group of figures come up with the interesting revelation that it took only half as many hours of work to clothe the average family last year as it did in 1914. Despite the fact that clothing prices rose some 300 per cent during the 34-year period, hourly wage rates increased 600 per cent. As a result, the average workingman needed to labor less than five hours a week to pay his 1949 clothing bill.

In 1948, a wage earner could outfit himself with an overcoat gloves, hat, suit, shirt, socks, and shoes by working 61 hours. In 1914

(Continued on page 47)

THE USE OF GAS IN BUSINESS

NO. 7 OF A SERIES

Shown left is the attractive Peter Pan Snack Shop which recently opened up at the busy intersection of Western and Devon Avenues, Chicago. Here 1800 to 2000 customers are served daily.

TASTY food and courteous, fast service, is the secret formula for success in keeping the Peter Pan Snack Shops on 19-hour daily schedules. There are four of these attractive restaurants ideally situated in busy Chicago neighborhoods for customers who are in a hurry as well as those who have more time.

In the preparation of the choice snacks served, gas is used exclusively on modern stainless steel equipment. This is done in open kitchens, visible to all diners. Gas has proved to be the ideal fuel in this type of restaurant where speed, efficiency and economy are important factors.

THE PEOPLES GAS LIGHT AND COKE COMPANY

Routine items in atomic labs must be checked regularly for possible presence of harmful radioactivity

Acme

Here Are The Facts Behind The Atomic Radiation Worries

Atom Worries: There's More To Fear Than The Bomb

By

GEORG MANN

ATOMIC radiation, like the A-bomb itself, has given mankind something new to worry about. Like most other human apprehensions, however, the fear of radioactivity has been fostered by a few facts and a great deal of fancy.

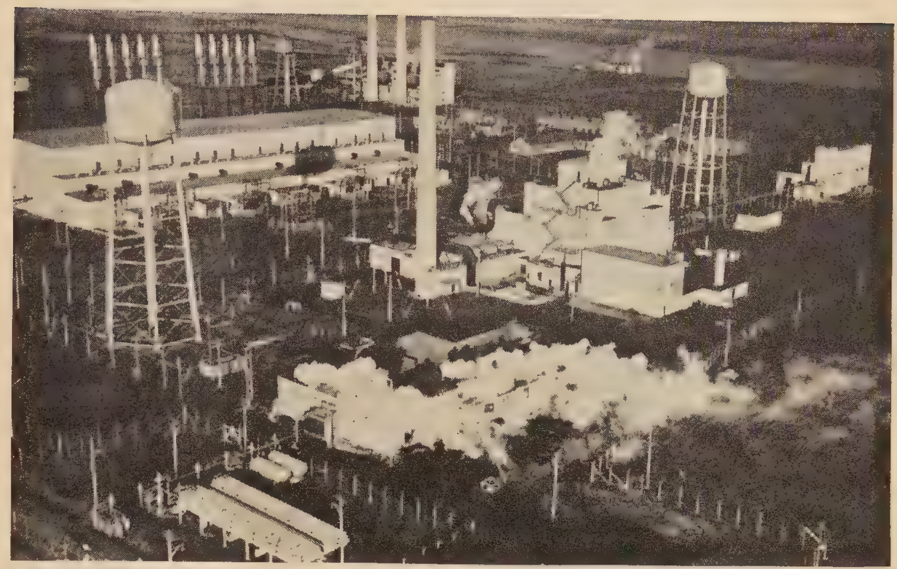
In Fort Worth, the relatives of an office worker who died recently charge that he was killed by exposure to radioactive materials while working at the Oak Ridge atom plant some time ago. In Chicago, a doctor living near Stagg Field's first atomic pile believes his mother's death from cancer was hastened by lethal radiations. Periodically, rumors come from Oak Ridge of workers collapsing on the job and being bedridden for days because of radiations. In England, a labor union secretary has charged that 20 out of 50 workers in one atom laboratory have become sterile.

Effect On Grandchildren?

Fears of radiation-caused misfortunes are not confined to non-scientists. Technicians working with radioactive tracers at the Beltsville, Md., research laboratories of the Department of Agriculture are reportedly alarmed over the possible effect of atomic radiations on their as-yet-unborn great-grandchildren.

What are the facts? Is atomic radiation the lurking killer in peacetime that such rumors and speculations might lead one to believe?

The answer is a carefully qualified "No." While it is true that some atomic rays are capable of killing and crippling under certain exposure conditions, science has already learned a great deal about handling radioactive materials so as to minimize their maleffect upon human beings. The Atomic Energy Commission, for example, has set aside $16,000,000 to compensate workers who receive dangerous doses of radiation. Yet, to date, five claims have been paid, and only 14 more are pending today.



Acme

"Hottest of the hot" atom labs at Hanford, Wash.—wastes are flooded by river water.

Responsible authorities shrug off the more fanciful rumors. British medical authorities have emphatically denied the union secretary's charge, insisting that any sterility among atomic workers had no connection with their jobs. Last year, our own Atomic Energy Commission flatly declared that it has "no record of any person having received a dangerous dose of radiation or having shown any evidence of radiation injury at Oak Ridge."

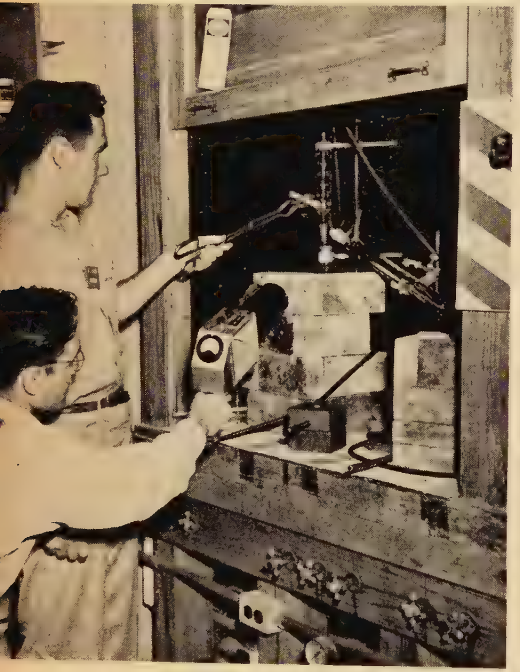
Tough Waste Problem

Nevertheless, life with the atom is nothing to take lightly, quite apart from the bomb menace. Last January, nearly a hundred experts an sanitation, public health, geology and weather forecasting met in Washington to discuss the single problem of atomic waste disposal. They wanted to head off future dangers.

So far, direct contact with atomic radiations is limited, but expansion is coming fast. Southwest of Chicago, Argonne Laboratory is being built; Brookhaven is nearing completion on Long Island, also Knolls Laboratory near Schenectady. Both Argonne and Brookhaven are close to population centers. Meanwhile, radioisotopes for research have been shipped to hundreds of laboratories, hundreds more will yet receive them.

Many People Affected

Thus, millions of people living near atomic piles and research laboratories have a direct interest in learning to live safely with the atom. So do tens of thousands of workers, supervisors and executives who actually work in atomic plants. Not only the laboratory biologist seeking a cure for disease, but the metallurgist in the auto plant, trying to improve piston rings through the use of radioisotopes, will be exposed to potentially dangerous radiations. The problem concerns the plumber who fixes the laboratory sink, the garbage man who collects the



Above: Pocket meter warns of over-exposure to radioactivity. Below: "Cooling" hot, radioactive iodine.

trash, and — above all — the sanitation experts who now encounter pollution problems potentially more dangerous than any they've faced before.

Fortunately, preparations are being made to tame the atom before such contact becomes too widespread. This was the purpose of the Washington meeting, where experts were briefed on such problems as how much radioactivity a human being can safely absorb. The experts also learned some facts which, if widely known, would curb the more exaggerated fears about atomic radiation. They were told about "formula LD-50", which is vital to atomic safety. The LD in the formula stands for lethal dose; the 50 means the dose will kill 50 per cent of whatever group of living things it strikes. An actual dose is measured in units called roentgens, (usually shortened to "r"), after the German scientist who discovered X-rays.

Whats A "Safe Dose"?

Human beings have an LD-50 of 400 r, meaning that half the people exposed to a 400 r dose will probably die. Rats, by the way, can withstand an LD-50 of between 825 and 900 r, lending support to the remark of a Harvard zoologist that rats may inherit an atom-devastated world. The minute, one-celled animals, called paramecia, are even tougher; their LD-50 is calculated at 300,000 r.

Few people realize that in the course of their lives they are exposed to amounts of radioactivity which are actually greater than those considered safe per day for workers at Oak Ridge. There, one-tenth of a roentgen is considered the maximum daily limit. But near sea level, thanks to cosmic rays and naturally radioactive substances in the world around us, the average person is exposed to a 2 r dose during his life. At the altitude of Denver, largely because of increased activity of cosmic rays, the average lifetime dose may rise to 20 r. Furthermore, the human body can contain four naturally radioactive atoms, Carbon 14, Potassium 41, radium and uranium, all of which give off radiations.

Human resistance to radiation is complicated. In treating skin cancer, a whacking 5000 r dose can be applied to a half-inch square on the skin with no ill effects. A normal chest X-ray produces an exposure of 10 r without damage. Eating a barium meal or standing in front of an X-ray while a doctor checks stomach or intestines exposes one to a dose of 40 r.

But, when an X-ray is taken, doctors rely upon half a century's experience in handling the potentially dangerous X-rays. The same is rapidly becoming true in the case of radioactivity. Scientists were once more casual. Henri Becquerel, the French discoverer of radioactivity, carried a lump of uranium in his pocket for days, suffering sever burns. Madame Curie also suffere from the radiations of radium.

As the result of past experience atomic workers now are allowed exactly .1 r exposure per day, no more. Employes in dangerou areas carry a pocket meter abou the size of a fountain pen to show how much radioactivity they'v been exposed to. So far, few case of serious exposure have been discovered. Since doctors figure tha human beings can withstand a radiation dosage of one r a day, the maximum one-tenth r limit provides a safety factor of ten to one

Just what are these radiations There are a good many kinds involved in atomic research. All are dangerous, some are fatal. Since they can't be seen, an ordinary person is unable to tell when he is being exposed. Some penetrate thick depths of concrete, others can be stopped by a sheet of paper or rubber gloves. Basically, the radioactive isotopes, of which there are some 600 to 800, have different patterns of radioactivity. Some give off only one kind of radiations, some more than one. The length of time they give off these radiations also varies widely.

Three Kinds of Rays

The most important kinds of radioactivity are called alpha, beta, and gamma rays. Alpha rays—the nuclei of helium atoms—are given off by plutonium (used in the atom bomb), by many of the new man-made elements, by radium and by atom-smashing operations. They are dangerous and are treated much like deadly germs. Fortunately, the alpha rays cannot penetrate human skin and do not travel far.

Beta rays are given off by many man-made radioisotopes used as tracers in medical, agricultural and industrial research. Beta rays are streams of electrons, or negatively-charged electrical particles, moving at high speed. They are fairly weak, cannot penetrate rubber gloves, and protection against them is also relatively simple.

Gamma rays are clearly dangerous and require thick concrete and lead shielding. They are one reason why scientists have developed mechanical arms to handle chemicals. Gamma rays penetrate deep into the body, cause radiation sick-

(Continued on page 32)

Point Four: A Businesslike Plan For World Recovery?

President Truman—Plus Many Businessmen Say "Yes"; Others Call It "Sheer Fantasy"

By JOSEPH RAYMOND

BUSINESSMEN who try to keep pace with a complex world must now tuck a brand new economic phrase into their vocabularies. The expression — "Point Four" — has been cropping up in headlines since last January when, as the fourth point of his inaugural address, President Truman announced a program to encourage investment of American capital and technical know-how in "underdeveloped areas" of the globe.

Undeniably, the goal is a worthy one. Said the President, "We must embark on a bold new program . . . (making) available to peace-loving peoples the benefits of our store of technical knowledge in order to help them realize their aspirations for a better life. And, in cooperation with other nations, we should foster capital investment in areas needing development."

It is not surprising that reactions to the President's Point Four proposal have ranged from soaring acclamation abroad to scolding denunciation at home. Some American businessmen who are familiar with the extraordinary risks involved in foreign investment at present believe the proposal borders on sheer fantasy. Others who have explored the program in Washington take a far more optimistic view of its possibilities.

"Bold" World Plan

Furthermore, Mr. Truman's inauguration day proposal is evidence that the administration during the next four years will actively promote a "bold new" worldwide development program underwritten, in part, by private American capital. The means by which it will seek this goal deserves close inspection.

No one need tell the average businessman that putting his money into foreign investments is risky, especially if it moves into what the President calls "underdeveloped areas."

Investments may be nationalized; foreign governments may discriminate against outside investors, even forbidding them to convert profits into dollars.

Caution is by no means confined to private investors. Though created expressly to lend money for worthy development projects, the bank has cleared relatively few loans. Among the loans granted, Brazil received funds for hydroelectric power and telephone projects, Chile for electric power and agricultural machinery manufacturing, Mexico for the production and distribution of electric power.

No Global Cure-All

The U. S. government's own lending agency, the Export-Import Bank, has been equally conservative. It studied the Haitian 150,000 acre Artibonite Valley project for three years before it authorized a $4,000,000 loan to drain and irrigate the valley.

If the World Bank and Export-Import Bank are wary of most foreign loan propositions, why should private investors be any less so? The answer is clear: American capital is scarcely likely to leave home if conditions remain the same. Therefore, the administration wants to change these conditions. Whether this can be done, by virtue of the

(Continued on page 28)

Projects for Point Four investment would range from hydro-electric power to antiquated agriculture *Acme*

Arctic meteorological studies prevent losses and help business on "Main Street"

Weather Meets Its Master

Specialized Forecasting Is Helping Industry Whip An Old Foe: Weather Losses

By JOE EGELHOF

IF Mark Twain were alive today, he would have to eat his celebrated words regarding the weather. Businessmen in particular are now doing more about the weather than ever before. True, they still can't produce rain from cloudless skies, but in thousands of less dramatic ways industry is learning to capitalize upon the weather: snatching the most profits from fair weather and minimizing losses from foul weather.

This ability to cope with the weather has been a long time in the making. For years, business has written off weather losses as more or less inevitable. To the calculable cost of storm-wrecked buildings and heat-destroyed merchandise were added intangible losses: factory production plans shattered by days or weeks of crippling humidity, sales promotion campaigns wiped out by drenching rain, to mention only a few.

Today, however, such losses are becoming a thing of the past. With better instruments and more accurate meteorological information than ever before available, specialized forecasters are enabling business concerns to adjust plans to foreseeable weather conditions — days, weeks and even years in advance.

Production Planning Aid

With such help a construction firm, before pouring concrete, finds out how cold it will be at ground level, where the temperature may be 20 degrees below that of the "free air" five and a half feet higher. A baby chick farm, which ships by air freight, is warned against weather-caused delays which would kill the chicks by depriving them of food and water. A department store uses special forecasts in planning advertising and merchandise displays. Meat packers, to determine livestock availability on a particular day, receive forecasts on country road conditions.

In hundreds of factories specialized weather forecasts are assisting in production planning. A cough drop plant is advised, on the basis of probable humidity, whether to keep expensive air-conditioning equipment functioning over weekends; humid weather during the weekend shutdown can melt the lozenges and jam machinery. Leather producers are provided special forecasts to help them retrieve hides from outdoor drying racks before a rain, the problem here being that moving thousands of hides indoors in face of threatening clouds may take hours of unnecessary labor, yet a few drops of water is ruinous.

Since welding is affected by cold weather, welding firms use special forecasts to plan indoor work when the temperature is likely to dip low.

Business began to benefit from meteorology about a century ago, when forecasts were made available to sailing ships. Agriculture started using it in the 1890's, and the commercial airlines took private enterprise into the forecasting field in the 'twenties. It was really World War II, however, that greatly increased the number of practicing meteorologists. Military strategy required the training of thousands of expert weather forecasters and, since the war, many of these veterans have turned their attention to forecasting for industry.

War Boomed Forecasting

Actually, there was only one professionally-recognized weather consulting firm before the war. Today there are 13 and chances are more will be in operation soon. Each of these 13 consulting firms is recognized by the American Meteorological Association and licensed to make teletype connections with the national weather network which is operated by the Civil Aeronautics Administration and carries reports from the Weather Bureau, the Army, the Air Force, Mexican and Canadian agencies, and ships at sea.

Specialized industry weather forecasters do not compete with the Weather Bureau. Instead, they use the Weather Bureau's general forecasts to provide an individualized service beyond the bureau's scope. The bureau, of course, must serve all people and specialized forecasting is obviously impractical.

In contrast, the private forecaster studies the individual needs of the company he serves, in order to translate weather forecasts into production, sales or transportation guides. In addition to forecasting, he gives a company some idea of the reliability of each prediction.

The Chicago consulting firm of Murray and Trettel provides this typical case history to show how specialized forecasting is carried out. The problem in one plant was to correlate weather predictions with anticipated output. The factory was long, built North and South with the East wall having limited ventilation. Forges and work benches lined the well-ventilated West wall. Although it was known that hot Summer days had a definite effect on production, not enough was known of the weather influence to utilize forecasts as a planning guide.

To get at the problem, records of heat, humidity and winds were charted against actual output over a period of several years. From this information, statistical curve charts were prepared which are now used to translate 24 to 72-hour predictions for each of the three weather factors into actual production and efficiency forecasts. While these forecasts contain a recognized margin of error, they do give the plant manager definite assistance in future scheduling.

Weather and Efficiency

This phase of specialized forecasting has only scratched the surface of its possible applications. As more and more is learned of the influence of weather upon worker efficiency, it seems entirely possible that detailed projections can be made, indicating with considerable precision the influence, say, of so many inches of rainfall upon absenteeism or so many degrees of temperature and humidity upon worker efficiency. Such detailed guides would, of course, be invaluable in planning production schedules, avoiding assembly-line bottlenecks, and providing for materials availability.

Predict "Sales" Days

In the retail sales field, at least one large department store uses specialized weather forecasts to determine the ideal sales days for each season of the year. Obviously, the best day for a sale is one with no rain and a maximum amount of sunshine. Careful analysis of past experience has shown further that in Summer the temperature should be between 70 and 85, in Winter between 30 and 45. On the basis of such weather factors, the retailer can better determine whether he should hire more or less extra help for a Saturday and whether the day after tomorrow will be a good time to advertise a straw hat sale.

Sometimes, however, even the best weather forecast is contradicted by other factors. If a popular entertainer is appearing at a theater next to the store, many customers may be drawn to the area despite rain. If the bottom drops out of the stock market, no amount of sunshine will bring in shoppers. Thus, the specialized forecasters emphasize that they are evaluating weather factors only.

A varying margin of error is involved in all weather work. Forecasts may have to be made on the basis of indicated action of a number of uncertain meteorological influences. In this case, a company is warned that the forecast has a "low confidence" rating. If virtually nothing could go wrong, a "high confidence" tag is attached. In between are "normal confidence" forecasts. Margins of error for a particular firm generally are reduced as records are made and corrections put into effect. It may take two to 20 years to get a specialized service to a small margin of error.

A New Orleans

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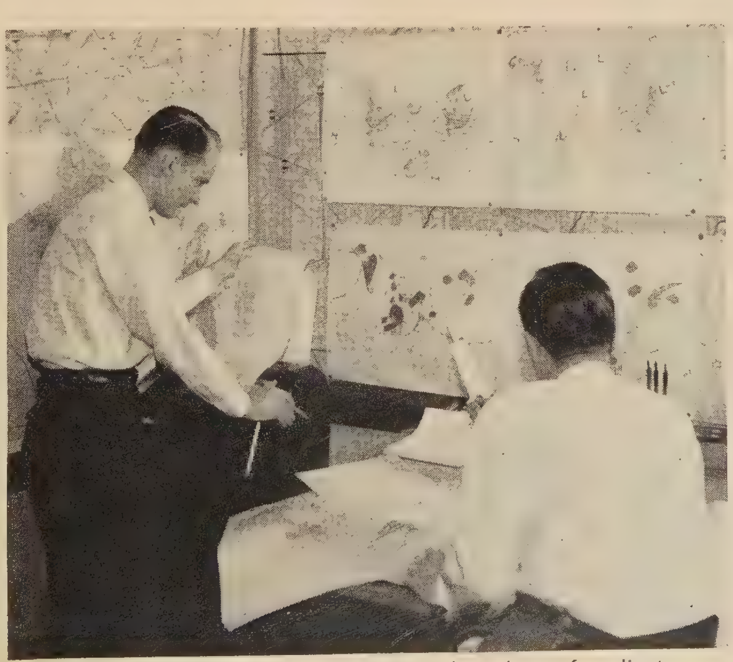

Murray & Trettel forecasters watch weather charts for clients

Glue Minus Old Dobbin . . .

New Synthetic Adhesives Give Better Brake Linings, Autos

By JOHN A. McWETHY

THE glue works, once prudently isolated on a community's farthest fringes, is scarcely recognizable nowadays. When one visits a modern glue works, he is likely to find an anticeptically-pure, agreeably-fragrant laboratory turning out adhesives which are, themselves, as different from yesterday's "stickums" as the plants that make them.

The secret of these new adhesives is that they are not made from horses' hoofs and fish bones, but from a wide variety of new synthetics derived from such raw materials as coal, petroleum, air, limestone and water. The synthetic-based adhesives — tougher, more versatile, and easier to handle than any former glues — are improving the quality and durability of scores of products. Often, they reduce production costs as well.

Benefits are turning up in one industry after another. The brake linings on 1949 Chryslers and Chevrolets, since they utilize a new adhesive, will probably last half again as long as those on last year's models. Grinding wheels, bonded with synthetic adhesives, far outlive older varieties, thus saving money for hundreds of metal working firms. Washable plastic wallpapers are reaching the market in greater and greater volume, thanks to the fact that synthetic adhesives can hold them to the wall, where no other glue will. The lead in many new pencils cannot possibly come loose or turn around, because synthetic glue cements it within the wood shaft.

Boom In Synthetics

These are only a few evidences of the progress that has recently been made in an industry that was going strong 3,000 years ago. Although history shows that King Tut's furniture was glued together back in ancient Egypt, it has only been in the last decade or so that science has developed adhesives which set in a matter of minutes, yet hold together, rivet-tight, such non-porous surfaces as plastic and metal.

This does not mean that industry is dropping older, "natural" glues made of vegetables and animal carcasses. Actually, sales of most varieties of adhesives have risen since 1939. Meanwhile, however, the synthetics have spurted sensationally. Here are a few indications of the upswing:

New Glues — New Products

One producer is now turning out four times the volume of synthetic rubber adhesives he did in 1939. Another company, specializing in synthetic "urea" resins, is selling 28 times its pre-war volume. The ureas are used extensively for making plywood and furniture. The Plaskon Division of Libbey-Owens-Ford Glass Company has found in a survey that 83 per cent of all furniture manufactured in this country today contains urea glues. Ten years ago, no urea adhesives were used for furniture.

While increased sales of natural adhesives largely reflect an overall rise in industrial production, today's big demand for synthetics indicates that this new family of adhesives is actually supplanting a number of other fastening methods. For one thing, the synthetics have partially replaced the loom in cloth-making. United

Synthetics glue fabric to metal chair seat

Ceramic tile can be placed three times faster with rubber glue than with mortar

And Furniture

One harmonica maker cut costs sharply by using plastic frames plus synthetic glue

Wallpaper's new draperies of "unwoven" cloth are a good example. The "unwoven" fabric is produced by passing cotton and rayon fibers between two rollers that impregnate them with a synthetic adhesive, sticking instead of weaving the fibers into cloth. Since the adhesive is flexible, the cloth is as pliable as woven fabric.

The new drapes look and feel like ordinary fabric and come in damask and floral patterns. Yet they retail for $1.98 a pair, less than half the cost of the cheapest woven fabric draperies.

Metal working firms have discovered that grinding wheels will cut metal faster if bonded with synthetic adhesives. Wheels bonded with phenolic resin adhesives cut at 9,500 surface feet a minute, while traditional wheel types, bonded with silica, have a top speed of only 5,500 surface feet a minute.

Tile Mortar Replaced

A new adhesive made chiefly from synthetic rubber has cut the cost of laying ceramic tile. Minnesota Mining and Manufacturing Company, which produces this adhesive, claims a worker can put three times as many tile in place as he can with ordinary mortar. Since one pound of glue will seal as much tile as 50 pounds of mortar, this also means a significant weight saving in high buildings.

The synthetics speed up furniture production because they can be hardened electronically. Bell Machine Company of Oshkosh, Wis., makes a device using Raytheon electrical equipment, which sets veneer furniture cores in a mere 30 seconds, whereas animal glue requires three to four hours. The machine fires a bolt of high-frequency electricity through a synthetic glue, changing its molecular structure and thus hardening it in a twinkling. Animal glue, if similarly charged, would melt and run out of the joint.

Better Brake Linings

B. F. Goodrich Company reports that an automobile manufacturer has cut production time by using electronic hardening equipment to glue a plastic knob to the window glass on one of its models. The bond is reportedly stronger than the glass itself.

Even more interesting in the auto field, however, is the use of synthetic-bonded brake linings on new Chryslers and Chevrolets. Instead of being riveted to the shoe, the linings are stuck on with a synthetic adhesive. The point is that rivets pierce nearly half of an ordinary lining; hence, it must be replaced before the rivets are reached. Rivet-less linings, however, will last until worn down to the shoe.

A marine engine maker, using the same method to attach linings to a compressor shoe, has not only developed a better product, but also has increased output from 25

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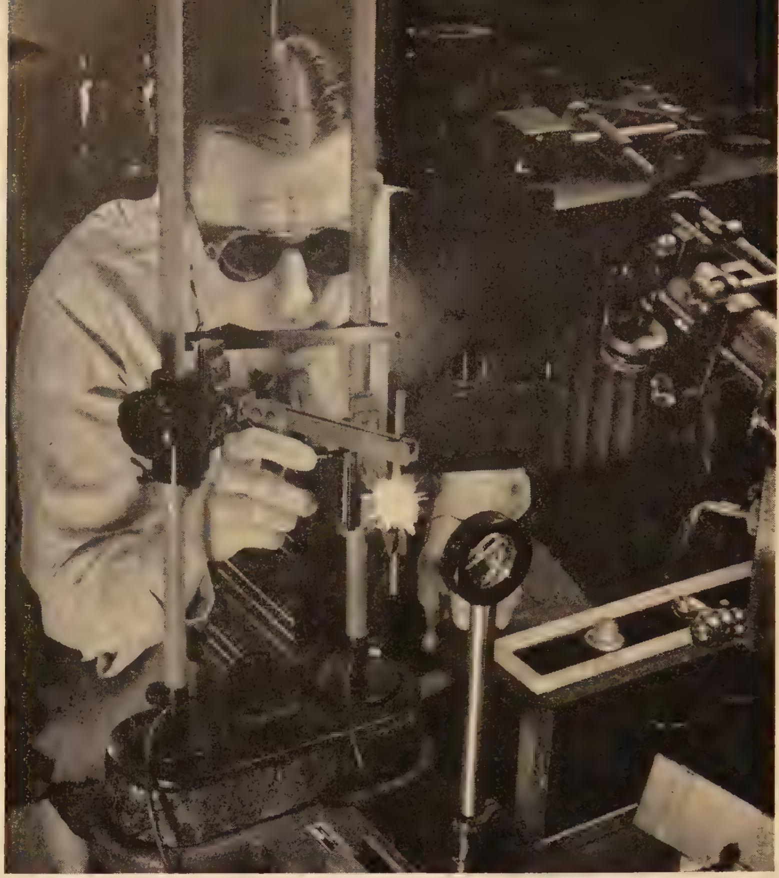
Clock assemblers bond glass to brass rims with new, quick-drying adhesives



Research On A Small Budget

By BENJAMIN MELNITSKY

SOME years ago a bright-eyed Harvard undergrad walked into his professor's office to set forth an idea that was unique even for a student of that unorthodox institution. He had an idea for a new product, the student said, and, after explaining it, suggested that his professor drop classwork and devote full time to helping in its development. The professor agreeing, it was not long before student Edwin H. Land and Professor George W. Wheelwright had invented Polaroid, setting the stage for one of the most successful business ventures of recent years.

Launched on the proverbial shoestring in 1935, Polaroid Corporation, with Dr. Edwin H. Land as its president, had mushroomed a decade later into an enterprise doing a $16,000,000 wartime business. Significantly, the company was born of an invention and, since then, research has enabled it to overcome the disadvantages that harass many small enterprises: lack of capital, consumer resistance to a new product, competition from established firms, lack of a diversified merchandise line and a shortage of experienced personnel.

Even more significant, perhaps, is the fact that Polaroid was launched without the benefit of large-scale research facilities. Land, himself, has been more than an inventor, however. While still in his teens, he began searching for a way to polarize light. For ten years he worked at the problem before perfecting Polaroid, a laminate composed of tiny iodine-quinine crystals sandwiched between sheets of clear plastic.

Vital To Small Concern

Today, Land feels that research is more vital than ever to the small concern. Recalling the experience of his own firm, he declares, "the small company of the future will be as much a research organization as it is a manufacturing company."

Polaroid's president is not alone in this point of view. Many leading business observer are convinced tha small concerns mus take far more advantage of scientific research if they are to survive tomorrow's competition. The objective is not merely new inventions. As the Standard Oil Company of California points out, the objectives of industrial research are:

1. To cure existing troubles in connection with materials, processes, products and services, and to anticipate and prevent such troubles.

2. To reduce costs.

3. To improve quality.

4. To reduce consumers' operating costs.

5. To develop new uses for existing products.

6. To develop substitutes.

7. To develop new materials and processes.

8. To improve manufacturing techniques.

9. To utilize by-products.

10. To contribute to the common store of technical knowledge.

It is no secret that research, for the most part, is concentrated in large companies. Surveys indicate that by far the largest number of research personnel are employed by a small fraction of our biggest corporations. The point, however, is not that big business is monopolizing research, but that these enter-

(Continued on page 42)

Cal-Sag Plan: Bottleneck Breaker

New Waterway Development Would Speed Great Lakes-to-Gulf Barge Traffic

LOUIS JOLIET, the first white man to explore the upper Mississippi River, is also credited with proposing for the first time that the Great Lakes and the vast Mississippi River system be linked by a man-made waterway. Joliet's official report, submitted almost 300 years ago to the French governor of Canada, contained this farsighted suggestion:

"It would only be necessary to make a canal by cutting through half a league of prairie," he wrote, to connect the Great Lakes and the entire Mississippi valley. Oddly, his idea is still only partially achieved. Today, however, a really adequate channel between the two great waterways of mid-America is nearer realization than ever before.

Contemplated Long Ago

The means for its accomplishment lies in what is rather prosaically called the "Calumet-Sag Project." Despite this unexciting title, the Cal-Sag plan would accomplish what shippers have contemplated for many generations: it would connect the Great Lakes and the Mississippi by way of a modern barge canal, making possible economical, large-scale commercial traffic between the two waterways.

It is true, of course, that the lakes and the river system have been technically "connected" since 1848, when the first horse-drawn canal boat was hauled into Chicago over the old, and now abandoned, Illinois and Michigan Canal. Since then, the larger Chicago Sanitary and Ship Canal has been built over a similar route to link the Des Plaines River (a Mississippi tributary) with Lake Michigan just north of Chicago's busy Loop.

Bridges Delay Traffic

The Chicago Sanitary and Ship Canal, however, is inadequate as a commercial waterway. In Chicago, it is arched by a network of bridges that delay water traffic and restrict the use of larger river vessels. Furthermore, ship-to-barge transfer facilities are very limited at the canal's lakeside terminus.

For some years, therefore, attention has centered upon a secondary waterway, the Calumet Sag channel. It was built in 1922, not for commerce, but for sewage disposal. It now serves, however, more by necessity than by design, as a heavy traffic cut-off. The Cal-Sag channel leaves the Chicago Sanitary and Ship Canal 34 miles southwest of Chicago harbor, swings eastward for 16 miles to connect, via the Calumet River system, with Lake Michigan near the Illinois-Indiana border.

"Natural" Water Route

At present the 60-foot-wide Cal-Sag channel is even less adequate than the older main route to "downtown" Chicago. Nevertheless, the canal follows a natural water freight route. As a result, barges use it despite the handicaps imposed by narrowness and shallowness. Today, Cal-Sag manages to handle about 2,000,000 tons of cargo a year.

Potentially, however, the Cal-Sag channel offers several distinct advantages. It by-passes the downtown Chicago area, moving instead through a concentrated industrial area where heavy tonnages of bulk cargo are imported, exported and stored.

Of even greater potential importance, perhaps, is the fact that the Cal-Sag channel provides a di-

Barge traffic today on narrow, bridge-impeded Sag Channel; plans call for widening the waterway

Army Corps of Engineers

rect water link between the Mississippi system and Lake Calumet, an 1,850-acre inland harbor capable of handling the largest lake vessels. Lake Calumet is potentially an ideal interchange point for the transfer of commodities between Great Lakes vessels and barges, and also between land and water carriers.

Limited Work In '30s

In the last two decades, substantial progress has been made toward the development of Cal-Sag as the principal connecting link between the Mississippi system and the Great Lakes. In 1930, Congress authorized the Army Chief of Engineers to determine whether such a development would be practical. After exhaustive studies, the Army answered in the affirmative. As a result, a limited amount of developmental work on the old sewage canal was authorized and carried out in the latter 'thirties. Passing places were established, the Calumet River was partially dredged, an entrance channel from Lake Michigan was constructed, and a terminal basin was partially developed in Lake Calumet to accommodate lake and barge traffic.

The biggest step forward in Cal-Sag planning came in 1946, when Congress authorized the construction of the overall navigation project. Although funds have yet to be appropriated to activate the project, the Congressionally-approved plan, in brief, provides for developing a continuous channel with a minimum depth of nine feet and a minimum width of 225 feet, connecting Lake Michigan by way of the Cal-Sag channel and the existing Chicago Sanitary and Ship Canal with the Illinois and Mississippi Rivers. The Cal-Sag waterway would thus have the same minimum depth and width as the Mississippi waterway between Joliet, Ill., and St. Louis, Mo.

Improvements Planned

The project would involve a number of improvements along the present channel. Specifically:

(a) The Chicago Sanitary and Ship Canal from Lockport, Ill., to Sag Junction (the point at which Cal-Sag swings eastward) would be widened from 160 to 225 feet.

(b) The Calumet-Sag channe from Sag Junction to the Litt Calumet River would be widene from 60 to 225 feet.

(c) A channel, 225 feet wide an nine feet deep, would be constructed in the Grand Calume River from its confluence wit Calumet River near 130th Stree in Chicago to its junction with th Indiana Harbor Canal and thenc in that canal to the present hea of deep draft lake navigation a 141st Street.

(d) A channel, 160 feet wide an nine feet deep, would be constructed in the Grand Calume River from its junction with th Indiana Harbor Canal to Clar Street in Gary, Ind.

(e) Two locks would be constructed in the Calumet River t regulate the diversion of wate from Lake Michigan and to prevent polluted water from entering the lake at Calumet Harbor Also, throughout the course of th channel all obstructive bridge would be rebuilt or removed.

Under present plans the Cal-Sag project would be divided into tw

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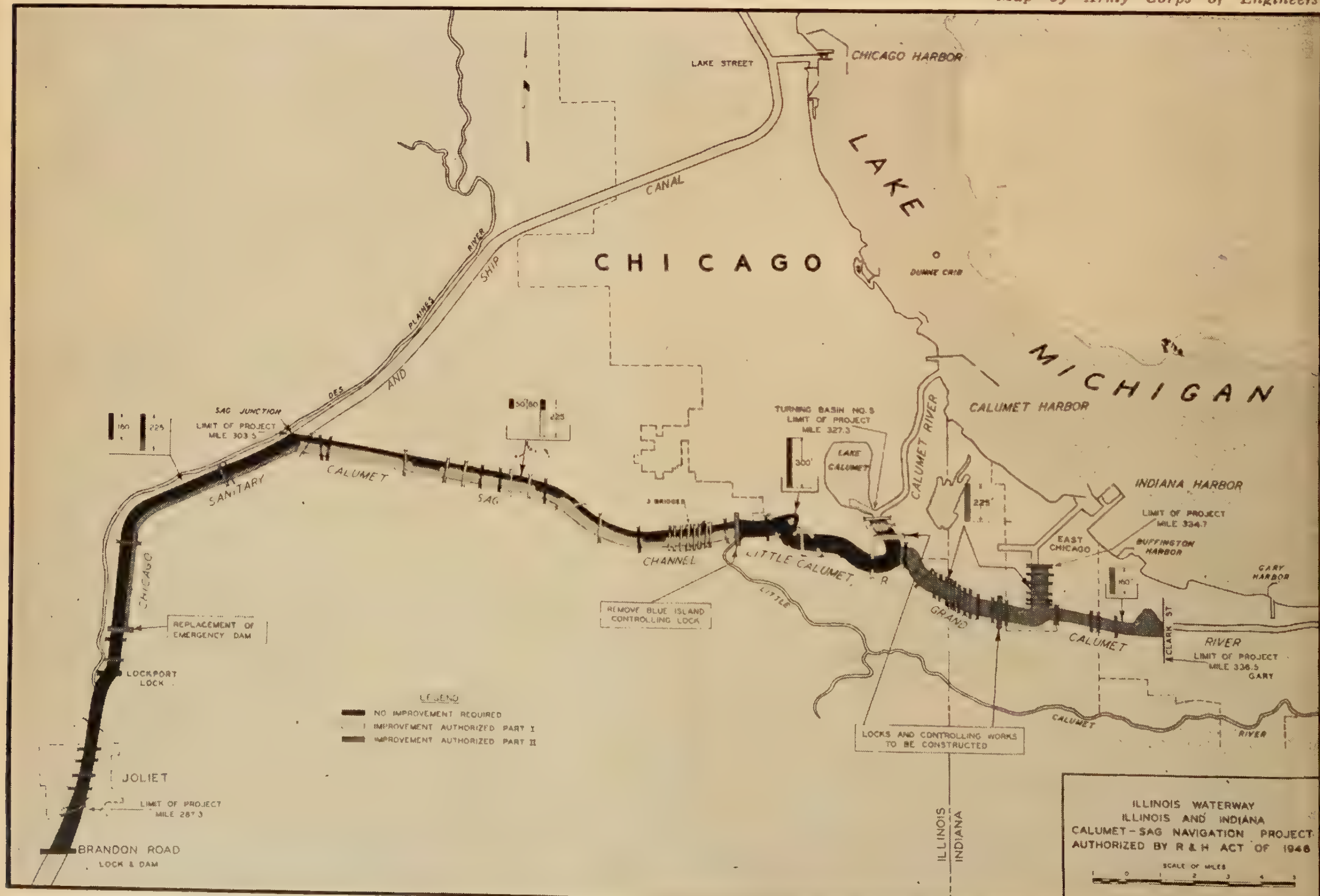
Map by Army Corps of Engineers



As Capital Expenditures Go So Goes Prosperity

By DEXTER M. KEEZER
Director, Dept. of Econ.
McGraw-Hill Publishing Company

OUR country is going through what seems to be getting established as an annual postwar fixture — the spring attack of jitters about immediate business prospects. This year's attack is more severe than last year's, and understandably enough. In most lines of business we have run through the rip-roaring phase of the postwar boom.

However, as I read the signs of what is immediately ahead for business this current attack of jitters will prove to have been ill founded. We have the basic economic foundations of a very high level of business activity for some months. Under such circumstances I doubt if we can shiver ourselves into serious economic difficulties, even if we work hard at it.

Optimistic On Outlook

If we stay out of war, I am also optimistic about the prospects for business over the next few years. I assume that we shall supplement large scale economic aid to Europe by military aid, and that we shall provide facilities, as well as know-how, to take some of the industrial backwardness out of backward areas the Communists have not grabbed first. If these operations are conducted with a modicum of good management, I think they will take up enough of any slack that develops in the economy to keep the country prosperous, if not happy for the next few years, say five to 10.

Over that period, the one big cloud on the business horizon is that produced by the relatively dark outlook for capital expenditures. If we let capital expenditures bog down badly, as it now looks as though we may, we shall be in all kinds of trouble, economic and otherwise. I propose to direct your attention to this potential trouble. My purpose is not to make you morose but to stir you to do something to try to avoid trouble. We can head into a crisis of tremendous destructive force in the field of capital expenditures unless we both watch and change our step.

Since V-J Day we have had a high level of capital investment. Private industry alone has put $46,800,000,000 into new plant and equipment. That is why we have had a boom. If business had not made those expenditures, the forecasters in Washington (and elsewhere) who saw six to eight million unemployed a few months after V-J Day might well have paid out on their forecasts. Economists argue inconclusively as to whether capital expenditure is the cause or the effect of general prosperity, but the fact remains that the volume of expenditures for new plant and equipment always makes the difference between prosperity and something else.

Capital Goods' Employment

Why this is true is not hard to understand. About 30 per cent of our industrial workers are engaged in producing tools and equipment. Also they are our highest paid industrial workers. Tool makers receive about one-fourth again as much an hour on the average as tool users. Steady employment for them is essential to general prosperity.

Well, what's there to worry about? Why can't we count on a continuation of the same high level of investment in plant and equipment which has put the steam in the postwar boom?

SPEECH
OF THE
MONTH

Made before the Chicago Assn. of Commerce and Industry, March 30, 1949

Dexter M. Keezer

Need Is Present

So far as both the needs and the desires of business are concerned, there is nothing to worry about. We found that out by a survey of "Business Needs for New Plants and Equipment" which our department of economics at McGraw-Hill completed early this year. The survey showed that over the next five years American business already has plans to spend $55,000,000,000 for new plant and equipment. That, together with new plans which are certain to develop if industry can finance them, is enough to sustain prosperity in the capital goods industries. The survey also showed that this equipment will be badly needed.

There is a widespread impression that the United States is very well equipped industrially. That is an illusion. Our survey indicated that to get American industry in first class condition technically we would need to spend as much as $100,000,000,000. At the rate we spent for modernization in 1948 that would take almost 50 years.

One of the most interesting indications of how badly new industrial equipment is needed in the United States is provided by the answer to our questions on how soon it is expected to pay off before it will be purchased. We found that three out of four manufacturing companies expect new equipment to pay for itself in five years or less. A third of the companies said three years or less. A survey by the Machinery and Allied Products Institute produced similar results. That does not mean, of course, that every expectation is realized. It does mean that the corporate officer proposing the purchase of new equipment must make a plausible showing that it will pay off in the very short periods cited. We wondered why the pay-off periods were so short. The answer most often given was that with the limited funds they had available for new equipment the companies did not need to make them longer.

Accumulated Underdevelopment

When you stop to think about it, it is not surprising that our industrial plant is badly run down in many places. During the depressed thirties there was relatively little investment in new plant and equipment. During the war there was quite a lot but it was mostly for war equipment. Unfortunately, we haven't anything like a good inventory of the state of our industrial equipment, but there are a few samples of its antiquity in a few key spots:

Over half of our machine tools are over twelve years old. Half of our coke ovens are worn out and obsolete. They are only half as efficient as modern ovens. By producing a lot of poor coke they lower the quality of the steel the coke is used in making. A half million of our freight cars — about a third of the total — are over a generation old. Over half of our textile looms are over 20 years old.

Some of their owners obviously love these antiques and cannot bear to part with them. For the most part, however, they are more than eager to get rid of them and get modern equipment. In a myriad of cases this means new or much better products at lower cost.

Here is a current example from the steel industry. Strip steel for tin-plate is now annealed in batches. A new continuous annealing process has been developed. It will only require four to five hours to anneal a tonnage of steel that now requires 120 hours. And the annealing will be done better with far less handling and much lower inventory requirements.

New Processes and Products

Revolutionary things are happening to the things that go into the cans, too. I am told that by using vacuum "molecular distillation" it is possible to make sardines and even more noxious fish smell positively delightful. That, of course, opens the way to the medical and industrial use of cheap vegetable and fish oils that have never been used for bouquets before.

I have my fingers crossed on the beneficence of television. I think it may ultimately wreck the American home beyond recall. But it is wonderful. And it is only one of countless companion developments in the field of electronics which eliminate human drudgery. Here is an example in the textile field. In 2½ minutes an electronic inspector does a job in checking the color of dye which it formerly required an hour and a half of work with human eye, and mighty dull work at that.

Coal mining has the reputation of being a dirty and dangerous job. I suspect that is a primary reason why there is so much toleration of John L. Lewis' imperial performance with his miners' union. But automatic mining machinery has been perfected. It will make the job of most miners that of a skilled and relatively comfortable engineer of an automatic machine. It will increase output per man-hour ten times.

No, there is nothing to worry about in the outlook for capital expenditures both so far as the desires and needs of business are concerned. Business wants to go ahead with a big program and it is badly needed. Our survey knocked right on the head the idea that this postwar surge in capital expenditures is a flash in the pan. We still have a long way to go to get anywhere near caught up.

The thing to worry about and to worry a lot about is where the money is coming from.

Last year the principal source o money with which to buy new industrial plants and equipment wa corporate profits. As a matter o fact, profits have always been th major source of money for nev plant and equipment. But las year they played a larger part tha ever. Of $17,100,000,000 spent fo new plant and equipment by American corporations, about $12,500,000,000 or more than two-third came from profits. Only abou $500,000,000 came from the sale o common stock.

Here is where the economic program being pressed by President Truman and his Council of Economic Advisers gets binding. They say that last year corporate profits were too high. The President proposed to take about $4,000,000,000 more in taxes. About $3,000,000,000 of this would come from corporate profits. That is in addition to the sum of about $13,000,000,000 taken by the present tax of 38 per cent on corporate profits.

There is no doubt about it. Corporate profits last year were high. Measured by dollars of sales (the way to measure them when the objective is to make them look as modest as possible during a period of big sales) they were no higher than they were in the best prewar years. In fact, they were probably lower than in 1941. Even so, profits last year were high.

Lower Profits Predicted

But there is little reason to expect profits will be as high this year. In fact, it is safe to guess that they will be 10 to 15 per cent lower than they were in 1948. If $3,000,000,000 more of taxes were to be taken from last year's total of corporate profits (about $21,000,000,000 after taxes) it would, I am sure, put a real crimp in the capacity of many corporations to carry out plans to buy new plants and equipment. Advocates of this tax increase argue that some corporations and even industries which made large profits last year are spending only a relatively small share of them for new equipment. That is true. But it is anything but the general rule.

If $3,000,000,000 more of taxes is taken from a volume of corporate profits 10 to 15 per cent lower than that of last year, it can raise

(Continued on page 50)

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Glue Minus Old Dobbin

(Continued from page 19)

to 90 units per man hour. Glueing, of course, takes less time than riveting.

A West Coast trailer producer, the Kit Manufacturing Company of Norwalk, Calif., shifted from rivets and screws to glue for fastening aluminum bodies to plywood frames. The result was quicker production, stronger trailers and quieter operation because aluminum panels cannot loosen or buckle.

The pencil is a good example of how synthetic glues are improving everyday products. Leads used to have an aggravating habit of working loose, turning around, perhaps falling out, because old-fashioned natural glues wouldn't stick to lead. Now pencil makers use a synthetic adhesive that welds the lead firmly to the wood. Another annoyance—loose chair rungs — will become less common, thanks to synthetic adhesives. They don't dehydrate and powder as readily as animal glues in hot, dry houses.

The synthetics have literally made some products possible. Women's plastic shoes are stuck together with synthetic adhesives. Old-fashioned glues wouldn't last ten minutes on smooth plastic. Even sewing is out of the question, since plastic tends to rip when sewed. Synthetics are also important on luggage and handbags fashioned out of plastic. Many tables now have tops of laminated paper or cloth stuck together with synthetic adhesives making the tops impervious to cigaret burns, alcohol or water.

Use In Boats

In the molded plywood boats, which have appeared in the last few years, synthetic adhesives provide a strong flexible and waterproof bond. The boats need no caulking, are 35 to 50 per cent lighter in weight than ordinary craft, and their makers contend they're 50 per cent stronger than those built with orthodox methods.

One of the most interesting applications of synthetic adhesives was devised shortly after the war by a Philadelphia harmonica manufacturer. His problem was to cut production costs in order to compet successfully, in spite of high labo costs, with cheaply-produced ha monicas imported from abroad.

The solution lay in molding th harmonica forms from plastic, a operation that was made possibl only after the manufacturer di covered that he could use syntheti adhesives to seal in the meta sounding plates. As a result, pro duction costs dropped abruptly.

Although the synthetics are driv ing for more and more business manufacturers of other types o glue are not, for the moment a least, worrying about competition The entire adhesive industry i turning out about 1,000,000,00 pounds of glues annually, or abou half again as much as before the war. Dollar-wise, the industry's vol ume adds up to about $160,000,000 considerably more than twice tha of a decade ago. From practically zero, synthetics have increased t the point where they probably account for 10 to 15 per cent of the industry's poundage and 20 to 30 per cent of dollar volume.

Vegetable adhesives still account for more poundage than any other variety. In 1948, about 260,000,000

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pounds were produced from wheat, tapioca, corn, soybeans and potatoes. In 1939, vegetable adhesive output was 178,000,000 pounds. But vegetable adhesives are cheap—they sell for as little as a nickel a pound (synthetics sell for as much as $1 a pound)—so their sales value was only about $18,000,000 last year. They are used for sticking together such products as food packages, corrugated paper boxes, for putting labels on bottles, in making plywood, on postage stamps and for scores of other purposes.

Perfumed Animal Glues

Bones, hide and blood are currently being used to make about 150,000,000 pounds of animal glue a year. Some varieties of animal glue are mixed with perfume (not to make it smell like a blossoming orange grove but to neutralize its unpleasant natural odor.) Because this kind of glue is worth more per pound, the dollar volume tops vegetable adhesives and is now running about $35,000,000 annually.

Paradoxically, the big meat packers aren't the largest makers of animal glue. Peter Cooper Corporation of Gowanda, N. Y., one of the oldest and biggest companies in the United States, makes its glue from tannery hide trimmings. Swift, Armour and other packers are, of course, very important factors in the business. While cow hides are the most important raw material for this kind of glue, other varieties of skins are also used. The Connecticut Glue Company of Danbury, Conn., for example, does a $500,000-a-year business converting rabbit skins into glue. Animal glue is used for making furniture, sandpaper, and, among many other applications, for sticking the tips on matches. It's the only kind of glue that will work on matches. It produces just enough porosity in the tip to prevent a match from exploding when lit.

How the three major types of adhesives — animal, vegetable and synthetic — will stand in dollar sales a decade from now is anybody's guess. It is certain, however, that the synthetics will maintain their drive for an increasing share of the adhesive business, edging into still more unusual fields where their adaptability is yet to be shown.

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Point Four: Businesslike Plan For World Recovery?

(Continued from page 15)

Point Four plan, remains to be seen.

Point Four is not regarded by the administration as a global cure-all. It does not seek to industrialize every backward area of the world overnight. Nor is it supposed to finance a huge number of development programs running into billions of dollars. Instead, Point Four planners want to encourage the export of a relatively modest amount of American capital and a very large amount of American "know-how."

For one thing, the planners figure that American investment dollars will serve little use abroad until the "underdeveloped" countries have learned to use the facilities they now have. Teaching them how will be the job of technical experts provided by the government, industry, and American educational institutions.

Conquering malaria in some Latin American countries, for example, will do more to boost worker output than any other single thing. A cooperative U. S.-El Salvador research mission devised ways of making pulpy coffee residue palatable to milk cows. If all the coffee pulp in Latin America were converted, it would supply the food equivalent of 34,000,000 bushels of corn a year.

Provide Advisory Service

Assistant Secretary of State Willard L. Thorp wants to make U. S. experts available to advise on schools, farming, health, fiscal policy, distribution, transportation and banking. Furthermore, it is planned to have large scale missions go abroad to advise on complete development programs.

Thorp explains the advisory phase of Point Four this way:

"In the poorer and less developed areas, a basic improvement in health, literacy and vocational skills may well be prerequisite to increased production and improved standards of living. It is also likely that, in many of the less developed areas, agriculture, rural and small scale industry and transportation may stand in most need of improvement. For the somewhat further developed areas, priorities are likely to be quite different, with emphasis on improvement in the functionin of government and increases in industrial productivity."

Discovering a nation's basic industrial problem is, of course, essential to a businesslike development program. The Joint Brazilian-U. S. Technical Commissio found that expansion and improvement in agriculture, fuels, railroad and electric power are among th most pressing of Brazil's problems Only 23 per cent of Brazil's farmer had any agricultural machinery in 1940. The rest had simple hand tools.

Fundamental Shortages

Brazil's marketing system, the commission found, is equally primitive. Its solution: cold storage warehouses. This, however, will require more power and more technicians than Brazil has. Also Brazil needs refrigerator freight cars and trucks. Considering that nation's industrial needs, the technical commission recommended expansion of the food processing, chemicals, plastics, fertilizer, metals, hand tool, cutlery, farm implement, railroad accessory, electrical equipment, wood product, tractor, paper and pulp, and tanning industries.

How is Brazil to pay for all this? Point Four and the United States provides part of the answer but Brazil, itself, must pitch in and do its share. It will be expected to provide most of the money (65 to 75 per cent for local labor and materials costs) and also "create the atmosphere" to encourage U. S. investors to provide the rest. Any nation benefitting from Point Four would be expected to provide similar cooperation if the aid program materializes.

Obviously, local cash will not be easy to raise. Brazilians, like most Latin Americans, sink an incredibly large part of their savings into luxuries. They love quick profits and have little patience with long term investments. Their stock market is stagnant, offering no facilities for floating large new security issues. Throughout Latin America only Mexico and Argentina have anything like a modern investment banking fraternity. The rest also lack active government bond markets.

Under the Point Four plan, the U. S. government would offer some guarantees to American investors. Direct private loans to foreign governments, like those of the 'twenties, would be avoided in favor of investments in certified development projects.

Precisely what such guarantees would cover will not be known until Congress acts on the Point Four proposal. It is probable that, if the measure is approved, the U. S. would at least guarantee that Americans will be able to convert part of their earnings into dollars. Government protection against risks of war, revolution, riot, discrimination and expropriation is less likely.

Differences Over Guarantees

Business and financial groups are in disagreement on the guarantee point. Some want guarantees, pointing out that they would operate like federal mortgage insurance. Others believe guarantees would make Point Four into a federal foreign investment program. All agree, however, that guarantees, alone, will not move American capital abroad. Before it does move, all feel that borrowing nations must negotiate investment treaties, promising fair and equal treatment to foreign capital, and, also, stabilize their budgets, currencies and economies.

The treaties would be aimed at preventing discriminatory taxes, extreme restrictions on transferring profits home, barriers against the free movement of technical employes, discriminatory import permit policies, unequal access to available foreign exchange, and exorbitant employment requirements. Today, for example, Colombia requires that 70 per cent of a foreign firm's employes be Colombians. Hence, an American firm which needs many U. S. technicians when it first sets up shop, must hire unneeded Colombians to make the ratio.

But no treaty and no amount of good will can check inflation, balance a budget, produce a surplus, or curb runaway bank credit. Yet all this must be done if Point Four is to have a chance. Inflation is at the vortex of the domestic and international problems faced by virtually all underdeveloped nations. Few Americans will risk having investments decline in value as infla-

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tion saps local currencies, nor will they chance having production costs soar 40 or 50 per cent in a year. Borrowers will have to lick the inflation problem themselves.

The Point Four planners believe that increasingly large foreign debts are feasible. As a starter, they would like to see U. S. risk capital develop mineral and light manufacturing industries. Both can be developed quickly. Their products will add to export volume and bring in badly needed foreign exchange.

They also feel that most domestic problems confronted by foreign nations can be licked, if the incentive is provided. Chile received no money from the World Bank until it resumed payments on bonds it had sold U. S. investors, had balanced its budget, reorganized its exchange controls, and moved to straighten out its balance of payments. Colombia wants bank money for electric power and agricultural equipment projects and it is taking strikingly similar steps, as are Mexico and Brazil.

Many people, who now say the United States must fill Great Britain's shoes as the world's major source of capital, liken Point Four to the job foreign risk money did in this country. There is good reason to doubt, however, that American capital will go abroad in the near future as Swiss, Scottish and English capital came to this country from 1850 to 1910. In the late Nineteenth Century the United States was an excellent investment market: there were no risks of revolution, discrimination, or nationalization and Americans welcomed foreign capital.

How bold, then, will be the President's "bold new program" for world development? Assistant Secretary of State Thorp, for one, predicts that "Point Four will someday be Point One" of United States foreign policy.

Whether this as-yet-visionary goal can be accomplished depends upon the response of American businessmen who have still to be sold a somewhat indistinct investment package. The administration will make every effort to present the package most attractively for it is certain that world peace depends heavily upon the speed with which our underdeveloped neighbors are brought to a stage of modern industrial efficiency. Whether the means can be provided to accomplish the end is, of course, another matter.

In the months ahead, Point Four and the arguments for it and against it will be steady fare not only for business, but for Congress and political leaders throughout the world. Legislation carrying out the President's Point Four program will be presented to Congress sometime this month. It has been drafted by the State Department and is expected to provide, at least, for technological assistance to backward nations. At the moment, it is not known how much financial assistance, if any, will be requested to supplement the technical-help phase of the program.

Cal-Sag Plan: Bottleneck Breaker

(Continued from page 22)

parts and would be completed within six years after work began. The first part would cover improvements between Sag Junction and Lake Calumet; the second part would cover the eastern end of the project along Grand Calumet River to Gary.

It requires no great accumulation of figures for one to visualize the commercial potentialities involved in the Cal-Sag project. One estimate by the Army indicates that total traffic, particularly of coal, grain, petroleum, steel, and scrap, over the improved Cal-Sag waterway would increase within five years of its completion to more than 9,000,000 tons, or over four times its present traffic. The Army further estimates that traffic would rise within 25 to 30 years to some 18,000,000 tons annually. The latter tonnage, incidentally, exceeds that which passed through the Panama Canal in 1946 by about 3,000,000 tons.

These estimates, made in 1945, are probably conservative for actual traffic over the existing waterway has increased substantially since then. Furthermore, the Army calculations make no allowance either for the expansion of existing industries likely to utilize the channel nor for the establishment of new industries along its course.

The initial cost of carrying out the Calumet-Sag project will depend upon construction costs prevailing at the time work begins. In 1945, the Army Chief of Engineers estimated the total cost of the Cal-Sag undertaking at $59,701,000, of which $45,791,000 would be borne by the federal government and the remaining $13,909,800 by local governments and cooperating railroads.

Rising costs have since forced an upward revision of these estimates. Based on current prices, the Army Chief of Engineers estimates the total cost of the project at $110,451,000, of which $82,371,000 would be borne by the federal government and $29,080,000 by non-federal agencies. Of the latter amount, $1,110,000 would be required for rights-of-way and the relocation of utility company installations, $5,350,000 for the alteration of railroad bridges, $22,200,000 for the rebuilding of highway bridges, and $420,000 for the construction of an interchange terminal at Gary, Ind.

It should be noted in connection with these estimates that the majority of needed right-of-way land is now publicly owned; hence, its acquisition would require only a paper transfer, not an out-of-pocket expense. Furthermore, the railroads which have bridges to be rebuilt or altered for the project have agreed to assume a portion of the cost of this work. Most of the new highway bridges to be constructed in connection with Cal-Sag would replace existing bridges that are either obsolete or too narrow for present traffic.

Governments Will Cooperate

Local government bodies which would be financially responsible for non-federal phases of the Cal-Sag project have already given informal assurance of their cooperation. These agencies, which include the City of Chicago, Cook County, Lake County (Indiana), and Illinois State, are now in the process of formalizing these assurances into appropriate legislation.

It is difficult to over-estimate the importance of the Calumet-Sag project to Chicago's industrial community. The improved Cal-Sag waterway would not only accelerate cargo traffic between the lakes and the Mississippi, but also facilitate the movement of bulk commodities into and out of the rapidly growing industrial areas which flank its course. The development of Cal-Sag, together with the improvement of Lake Calumet as a transfer basin, would also enhance the city's position as one of the world's great freight interchange centers.

It would be equally difficult to calculate the ultimate benefits of Cal-Sag's development to the average mid-Western consumer. Obviously, the utilization of water traffic facilities will make possible manufacturing economies in many industries which will utilize the Cal-Sag waterway. Army engineers estimated several years ago, upon the basis of the then-existing differential between rail and water freight rates, that the Cal-Sag would, within five years of completion, save shippers using it about $5,000,000 annually.

How soon the Cal-Sag project may move from planning board to actual construction depends upon when Congress appropriates funds

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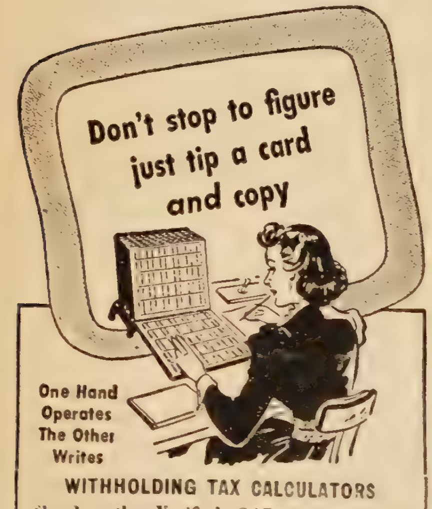

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to carry out the work it has already authorized. At present, Congress is being asked to make available funds to initiate a limited amount of developmental work which, in the long run, would save money when appropriations become available for the overall project. The argument in favor of beginning this preliminary work at once i that, by so doing, duplication and revision work will be avoided.

Atom Worries: More To Fear Than Bomb

(Continued from page 14)

ness, affect the blood and are one source of the atomic bomb's deadliness. The other source is the equally penetrating neutron ray, given off by the atomic pile and by various radioactive substances. Neutrons penetrate six feet of water and require heavy protective lead and concrete shielding.

While doctors know the effects of the dangerous rays, such as cancers and irreparable blood damage, they still are not satisfied with their knowledge of exactly how radiation kills. They are experimenting with animals, to find if gamma rays and neutrons destroy cells directly or cause injury by letting poisons from the cells escape into the body. They know rays cause the molecules which make up cells to become electrified. This electrification, called ionization, is related to the death of cells. Some animal experiments suggest that a lower dosage limit than the present accepted limit of one r per day may be preferred. A constant daily dose of one r has shortened a mouse's life, while daily doses of .5 r has damaged the ovaries of female mice.

Indirect Exposure

Direct exposure to the radiations is only part of the problem. Researchers are also worried about the possible effects of taking radioactive atoms directly into the body. They recall the lingering deaths of some girls who painted radium numbers on watch dials during World War I. These girl's licked their brushes to help shape the letters, eventually absorbing enough radium salts to cause death.

What happens when plutonium or some of the man-made radioisotopes are taken into the body? Plutonium is extremely dangerous, but fortunately, not much is taken up by the body if it's swallowed. When it does get in, it tends to settle in the bones, seriously affecting the body's ability to produce red blood cells. Furthermore, it i extremely difficult for the body t to get rid of.

Radiosodium, on the other hand, spreads quickly through the body, but is gotten rid of fairly quickly. Radioiodine usually winds up in the thyroid gland, which is why medical science looks upon it as a possible cure for thyroid cancer.

Danger Period Varies

Isotopes also vary in what scientists call their "half-life," or the time it takes to lose half their radioactivity. Radiofluorine, with a half life of about 118 minutes, doesn't last long enough to be much of a hazard. The two most widely distributed isotopes produced for research, phosphorus 32 and iodine 131, also have fairly short half lives. On the other hand, carbon 14, widely used in tracer experiments, has a half life of 5,100 years, presenting a major disposal problem.

Once the proper precautions are taken, however, Dr. Karl Z. Morgan, director of Oak Ridge's Health Physics branch, feels that handling large amounts of radioactive substances can be as safe as the handling of high voltages by a skilled electrician. An ordinary atomic pile will be as safe as a chemical factory, with no more than ordinary hazards. Most atomic plants, with the exception of the one at Hanford, Wash., could be operated close to big cities. One reason for this is the vast system of instruments and checks used to prevent radioactive wastes — gases, liquids, or solids — from contaminating the surroundings.

Getting rid of radioactive wastes is, of course, anything but child's play. As Dr. Paul Aebersold, chief of Oak Ridge's isotope division, points out, "When a thing is made radioactive, a certain number of radioactive atoms are made; there is no way in which you can cancel this radioactivity. Either you wait r it to die away, or if it does ot die away, you have to exclude some place, or else dilute it."

One disposal device to protect e public is a 330 foot smoke ack being built at Brookhaven carry away radioactive gases. ear it, an even taller tower, probbly the tallest structure on Long sland, is being built to serve as check on the smoke stack. From me to time, thick white smoke n be discharged from the second wer, to find out exactly what ill happen when more dangerous moke is discharged from the first. n added check will be provided y a number of meteorological intruments.

Keep Constant Check

At Oak Ridge, an elaborate sysem of instruments keep constant heck on air around the plant. ust is allowed to settle on colecting frames, then tested to see f it reveals radioactivity. A speial ventilating system traps and urifies the air that circulates round the slugs of radioactive etals. At Hanford, radioactive ases are washed and filtered before being given off through special ents.

Liquid wastes are another problem. At the Hanford plant, the hottest" of our atom installations, water from the Columbia River is rushed through to cool uranium slugs which are changed into plutonium and other fission products in the piles. The water picks up neutrons, and becomes slightly radioactive, so it is allowed to "cool" before being dumped back in the river. By the time it reaches the river again there's not enough radiation left to harm either plant or animal life.

This problem is not as great at either Brookhaven or Oak Ridge, where the piles are air-cooled. Yet both of these face other problems in disposing of liquid wastes. Underground storage tanks have been built to contain the "hottest" wastes. Some are stored and neutralized, then released into nearby streams. However, underground storage is difficult and expensive. There are plans for condensing the radioactive part of the wastes, evaporating the water, and thus saving storage space. The problem isn't critical yet, but will become so as operations are speeded up.

Solid wastes are more difficult to handle. Some can be buried, but there's only so much space. Some can be burned, but they require special incinerators to recapture the gases given off in burning. These gases might be radioactive and pollute the surrounding air. From at least one laboratory, solid wastes have been taken far out to sea and dumped in the ocean where radioactive materials can decay at their leisure. But some have wondered if some radioactive chemicals might not be evaporated from the ocean by the sun, drawn up into clouds, and eventually dropped on inhabited places as rain. There has even been one suggestion that certain "hot" wastes might be loaded into space rockets and shot far into space.

Buildings are another problem. At Oak Ridge, efforts are made to decontaminate a building that's picked up too much radioactivity. Then, if decontamination doesn't work, the building is painted,

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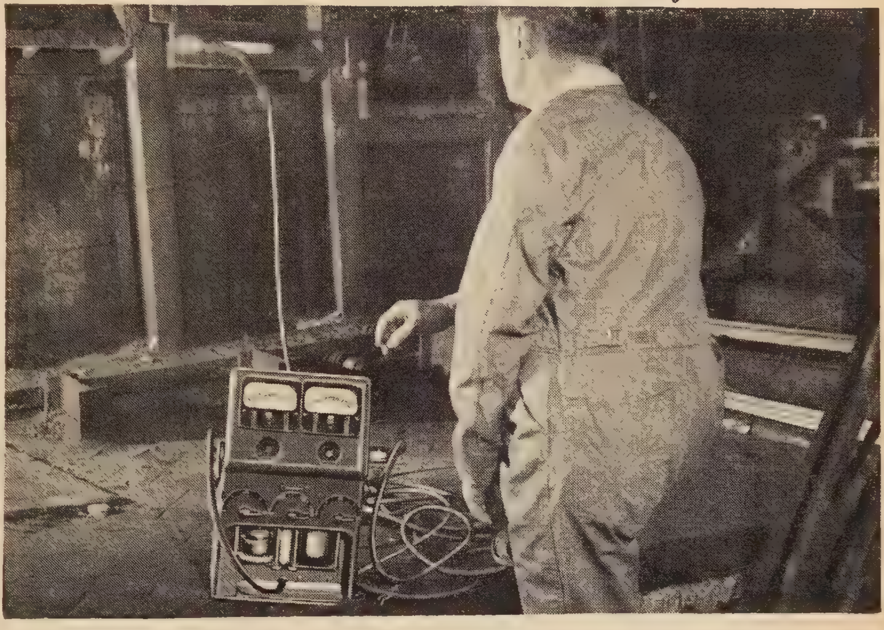

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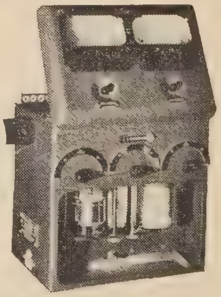

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taken apart board-by-board and buried ten feet underground. One university is said to have two buildings so thoroughly contaminated they can't be used any more. In another laboratory, a single afternoon's work released so many radioactive substances into the room, that the walls of the laboratory had to be torn down and rebuilt.

Waste Disposal

Clothing gets contaminated too, although often it can be thoroughly washed and re-used without danger. Ordinary wastes that turn up in a laboratory — biological specimens that are no longer useful, liquids that have picked up radioactivity during experiments — provide another problem. Eventually, there may be developed some sort of incinerator that does not allow smoke to escape, traps it, and makes it harmless. Even equipment is susceptible. At the moment, experts are trying to devise some way of de-contaminating metals so they can be re-used.

Actually, there are hundreds of problems involving radiation. What about insurance for atomic workers? Some is being written, but the problem is still open. What about periodic medical examinations for atomic workers? Dr. Rex H. Wilson, medical director for B. F. Goodrich Company, feels they are essential. Other experts believe atomic workers should be educated and licensed, to make sure they know how to handle the dangerous radiations safely for both themselves and the public.

While engineers have been devising protections against the hazards of an atomic environment, medical researchers have been looking for cures for radiation-produced diseases. They even started looking for a cure for the atomic disease "plutonism"—caused by radioactive plutonium—before an actual case had turned up. They've discovered that, although plutonium will collect in bones and affect the blood, the metal zirconium can be used to dislodge and replace it.

Other atomic ills have been attacked through other drugs. Certain vitamins, notably folic acid and pyroxidine of the B complex, slow down the deadly effect of radiation in mice. Some hormones—the pituitary, for example—and a chemical named rutin which comes from buckwheat also show promise. Another drug, toluidine blue, is said to be useful in stopping the hemorrhages that result from overdoses of radioactivity.

Posterity Will Know

In the long run, however, the most intriguing question about the effect of radiations won't be answered in our time. It involves the effect of these radiations on the genes, the tiny units which are the carriers of human heredity. Some pessimists have suggested that radiations—even the prevalence of X-ray—may have a dangerous effect from the genetic point of view. Will doses of non-fatal, non-injurious radiations eventually produce monsters and subnormal individuals. Scientists can't answer. So far, they only seem to agree that no bad effects have resulted from doses of radiation which do not exceed .1 r per day. As for the future, posterity will have to look out for itself.

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Invest in the MIDDLE WEST

Reviews of Middle-western Companies

By DANIEL F. NICHOLSON

WATER, by definition, is a deceptively innocent liquid. According to the dictionary it is a colorless, odorless, tasteless, transparent fluid, consisting of two parts of hydrogen to one part of oxygen. The catch is that rarely, if ever, is water found in a pure form. Water is the most universal solvent, with a faculty for picking up at least some portion of nearly everything with which it comes in contact.

The presence of "foreign" matter in water costs industry money. Impure water corrodes boilers, pipes and valves and chokes them with deposits, causes spoilage of products that come in contact with it in the manufacturing process, creates a health hazard, causes "foaming" which results in steam contamination and thereby lays up equipment such as locomotives until the condition is corrected, and raises fuel costs because corrosion and deposits of lime or other substances act as insulators. In the paper industry, for example, the presence of bacteria that multiply rapidly results in blotches that not only spoil some of the product but cause costly delays by weakening the paper so that it breaks frequently during manufacture.

Importance of Problem

A fair idea of the importance of water impurity problems to industry can be gleaned from the program of last month's annual Midwest Power Conference in Chicago. Three sessions of the conference were devoted to lectures on feedwater treatment, and a fourth was devoted to a symposium on steam contamination. No other single subject received so much attention at the three-day meeting.

In recent years a new industry has come into being to overcome the costly water problem. A vast amount of research and experimentation has produced chemicals and equipment to remove or neutralize the impurities of water so that damage to equipment and products is prevented or reduced to comparatively small proportions. Other industries have welcomed this newcomer and, as a result of favorable experience, have been eager to try every new water treatment chemical or process placed on the market.

Industry Position

The largest factor in the production, sale and servicing of water-treating chemicals is the National Aluminate Corporation. The company was incorporated in 1928 to succeed the Chicago Chemical Company, organized in 1920, and the Aluminate Sales Corporation, organized in 1922. Chicago Chemical Company produced and sold a boiler water conditioning product, while Aluminate Sales Corporation was its principal source of supply of sodium aluminate.

At the time the new company was formed it acquired certain patents and municipal water treating accounts held by the Aluminum Company of America, giving in exchange 27½ per cent of its capital stock. The latter company continues to hold this stock interest, and is the largest single stockholder.

Starting with a single water softening product in the 1920's, National Aluminate now produces scores of different chemicals and conducts an extensive research program that has maintained the company's leadership in a competitive field. The research staff now numbers 65 and includes ten Ph.D.'s.

Major users of the company's products, usually sold under the trade name Nalco, include municipalities, utilities, railroads, oil refineries, packing plants, and paper manufacturers. Each year since the middle 1920's, with one exception, industrial tonnage sales have in-

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creased. Some individual companies with plants in various sections of the country use as many as 30 different Nalco chemicals. Because of the rate at which industrial tonnage is expanding, the prospective loss of a substantial amount of railroad business as a result of dieselization is expected to have little noticeable effect on Nalco sales.

Principal Products

Principal products of the company are water softening chemicals used to prevent scale, corrosion or foaming in railroad and power plant equipment and to condition water for use in industrial processes and municipal water systems; zeolite or ion exchange types of water softening chemicals for industrial and household use; water clarifying chemicals for settling mud, silt, color or foreign particles in water; slime and algae control chemicals used primarily by paper manufacturers; and a catalyst used by oil refineries to promote the cracking of petroleum in the production of high octane gasoline.

Visco Products Company, a 78 per cent owned subsidiary, manufactures crude oil emulsion breaking chemicals to separate water from crude oil as it is produced. Visco also manufactures chemicals for conditioning mud used in drilling oil wells.

While National Aluminate has for years been concerned with what takes place in the water jackets and tubes of boilers, the company recently has been responsible for important progress in overcoming serious trouble created on the fire side by soot and slag. The company commissioned the Battelle Memorial Institute to help with research. The new Nalco SR-150 soot remover was placed on the market in 1948 with "outstanding results." The Battelle research is continuing, and the company sees the possibility that its soot and slag remover tonnage may exceed that of its water treatment products in a few years.

Working on Improved Softener

National Aluminate is working with Dow Chemical Company in the development of an improved resinous type of zeolite for water softening. In conjunction with Dow Chemical and B. F. Goodrich the company has developed a new weed killer for railroad rights-of-way.

Last Winter extensive tests were made with a new rust inhibitor for use in salt spread on city streets to melt ice. Results of the experiment are now being analyzed, and early reports have been favorable.

Two plants are owned by the

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ompany in Chicago. The principal plant is in the Clearing Industrial District. The second, also on the southwest side of the city, was operated under lease from the Defense Plant Corporation during the war and was purchased by the company in March, 1946. It is now known as the Catalyst and Zeolite plant. Aggregate floor area of the two plants is 188,000 square feet. The subsidiary Visco Products Company owns a plant near Houston, Tex. In addition, National Aluminate owns 49 per cent of the stock of Aluminate Chemicals, Ltd., of Montreal, Canada. The Canadian firm manufactures water treating chemicals in a plant in Toronto under a license granted by National Aluminate. The latter has earned a profit every year since its incorporation and has financed its growth entirely out of earnings.

Sales and servicing are effected through a field staff of more than 100 representatives equipped with testing apparatus to determine the proper chemical treatment needed to meet local conditions. The company carries a small line of mechanical equipment, manufactured by others, for the convenience of its customers. A consulting and testing service is also provided on an annual fee basis for smaller plants. While National Aluminate does not manufacture testing equipment, it has been active in the development of improved devices.

Emphasize Research

Probably the most noteworthy feature of a National Aluminate is the emphasis placed on research. Laboratory facilities are extensive, and activities range from routine testing of water samples from customers' plants to work with experimental boilers under pressures far higher than any encountered in regular service. Separate laboratories under expert technicians study bacteria and algae control, the control of caustic embrittlement in boilers, corrosion, and other phases of water treatment. The 65 employes engaged in this research represent a large proportion of the total of less than 490 employes.

Since the end of the war, the company has begun to develop export business, particularly in Latin America. Direct representatives have been appointed in Mexico,

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Peru, Venezuela, Central America, Brazil and Puerto Rico, and Italy. There has been a direct representative in Cuba for many years.

The first public distribution of National Aluminate Corporation stock was made in February, 1947, when 127,000 shares of the $2.50 par value common, representing 23 per cent of the total, were acquired from a number of stockholders by a banking group and offered for sale at $24 a share. The 550,000 shares of authorized and outstanding common stock represent the sole capitalization. The stock is traded in the over-the-counter market.

Dividend Record

Dividends have been paid each year on the common stock since the company was incorporated in 1928. The current 30 cent quarterly rate, equal to $1.20 a share annually, has been in effect since the final quarter of 1946.

Annual dividend payments since 1933 have been as follows: 1948, $1.20; 1947, $1.20; 1946, $0.85; 1943-45, $0.73; 1942, $0.82; 1940-41, $1.09; 1939, $0.91; 1938, $0.73; 1937, $0.73; 1936, $0.90; 1935, $0.45; 1934, $0.45; 1933, $0.36. The per share payments for 1933 to 1946 are adjusted to reflect the increase in number of shares to 550,000 from 100,000 in August, 1946.

Sales and earnings reached new highs in the year ended December 31, 1948. Net sales totaled $12,745,317, as compared with $12,624,435 for 1947, while net profit was $1,437,308, equal to $2.61 a share, as compared with $1,367,460, or $2.49 a share, for 1947.

A ten-year comparison of net sales, net income, and earnings per share, follows:

	Net Sales	Net Income	*Earned per sh.
1948	$12,745,317	$1,437,308	$2.61
1947	12,624,434	1,367,460	2.49
1946	9,751,619	1,158,839	2.11
1945	10,079,190	750,797	1.37
1944	10,392,325	840,611	1.53
1943	7,796,964	774,296	1.41
1942	6,193,839	619,767	1.13
1941	5,575,661	741,509	1.35
1940	4,261,320	685,805	1.25
1939	3,821,211	761,487	1.38

*Based on 550,000 shares.

Capital expenditures in 1948 were comparatively small, amounting to $168,562. This enabled National Aluminate to strengthen its working capital position. Net working capital at the end of the yea totaled $2,049,643, an increase o $662,897. Current assets aggregate $4,064,684, including cash $1,005 411, United States savings note $500,800, accounts receivable, $1,516,334, and inventories $1,042,139 The inventory total was more than $200,000 smaller than at the clos of 1947.

Current liabilities on December 31, 1948, totaled $2,015,041. Property, plant and equipment were carried at net depreciated value o $3,047,063. Total assets of $7,584,034 compared with $6,616,044 a year earlier.

Weather Meets Its Master

(Continued from page 17)

weather firm, A. H. Glenn and Associates, is helping a large oil company in one of industry's most dramatic projects — drilling in the Gulf of Mexico. Developing commercial oil fields in the open waters confronted engineers with a unique problem: ocean waves. The Gulf drilling project called for an extremely specialized type of forecasting, for wave heights are of critical importance in working from ships and drilling from platforms supported by piling. Waves influence the movement of drill pipe, casing, cement and mud, fresh water, fuel and other materials to the platforms, also the barging of crude petroleum back to shore. How important these off-shore weather forecasts are can be seen from the fact that some 12 to 16 hours of daylight are needed to evacuate the drilling rigs if rough weather is approaching.

Some of the weather firms have become highly specialized. Weathercasts of America, a St. Louis consulting service, specializes in the gas and electric company field, attempting to answer questions like these: "Shall we keep our men overtime to manufacture more gas? Shall we curtail our interruptible customers because of a cold outbreak? Will a cold wave be short and snappy or prolonged? What are the chances of having thunderheads disrupt our service tomorrow morning?"

In a pipeline company's control office, a consultant analyzes forecasts for communities along some 1,000 miles of natural gas line. If a cold wave is to last several days,

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ndustrial customers in a city may ave to be deprived of their gas.

In the hydro electric utility field, constant rain warning service elps in the maintenance of a maximum water level at power dams. If vater is spilled in anticipation of ain and the showers fail to develop, costlier coal-generation may e necessary to meet power demands.

The Northeast Weather Service of Boston provides short-range forecasts for the city's street railway, which in turn lets contracts for snow clearance when snowfall is expected to amount to eight inches or more. If this forecast goes astray, the railway has unnecessarily assumed a $10,000 minimum bill for labor. The Boston consultants also help a candy manufacturer in scheduling packing operations. Since candy spoils at high temperatures, the factory thus avoids the necessity of sending emergency trucks to rail yards to pick up shipments after a dangerous temperature rise.

Such forecasting as this is based upon the short-range weather outlook. There is another, and equally important, field in which the specialized meteorologist is aiding industry. This is based on climatological information, or the long-range analysis of weather trends and conditions. Determining whether Saturday would be a good day for a straw hat sale is one thing; deciding where to locate a plant upon the basis of long-term meteorological factors is another thing.

Heating Saving

Using data on long-term temperature ranges, the duPont Company, for example, has been able to reduce the estimates of the steam load in a proposed factory by as much as six per cent and the heating and ventilating load by 19 per cent. Precise rainfall information indicated that the sewer capacity could be reduced 10 per cent with consequent savings in construction costs.

Similar long-range studies have been made of prevailing winds in the vicinity of proposed factory sites. As a result, it could be learned in advance whether a plant would spray dust and ashes upon a nearby town. Since outside winds also influence interior air move-

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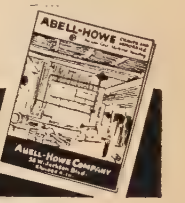

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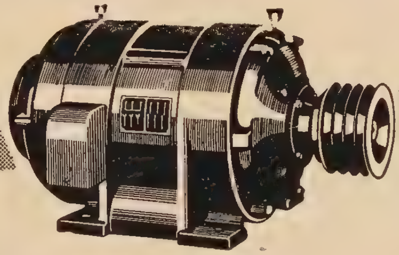

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ments, the same sort of studies hel factory planners to prevent the co tamination of light-colored, easi damaged products by dust and di from another part of the sam plant.

These advances in applied m teorology are taking place again a background of intensive stud and increased interest in the scienc of weather forecasting. Today, i fact, far more accurate informatio on humidity, precipitation, win velocity and the like are availabl to both government and privat forecasters. There are also mor weather forecasting devices avail able; among them, radar, which lo cates and follows a storm 200 o 300 miles away.

Predicts Growth

Private meteorologists, while con ceding that the going will be tough say they are on the way to a mor important place in the economy C. C. Bates, an oceanographer wh is consultant to the A. H. Glen firm of New Orleans, has drawn a analogy between applied meteorology and petroleum geology. Abou 30 years ago, he points out, whe the first "rock-hounds" left the campus for the oil fields, they wer thrown in the mud by roughneck drillers. No scientist was going to tell practical people "where` and how" to drill. Now, more tha 6,000 petroleum geologists belong to their professional society, Mr. Bates points out, and `the president of the world's largest company, Standard Oil of New Jersey, is one of them.

The Weather Bureau is wholly behind the new industry for it believes the private forecasters help the bureau to turn its attention "to the broader field of service." Part of this broader field of service is long-range forecasting.

Accurate long-range forecasting, a field where consultants do not venture, would be of inestimable value to business, but progress is bound to be slow because of the complexity of large-scale atmospheric changes. Whether meteorology will grow steadily as a business science involves a prediction that men of the profession are reluctant to make. However, it appears certain that industry will continue to confound Mark Twain — by doing more and more about the weather in the years ahead.

INDUSTRIAL DEVELOPMENTS

IN THE CHICAGO AREA

INDUSTRIAL developments in the Chicago Industrial Area during April totaled $6,759,000 compared with $5,848,000 in April, 1948. Total expenditures in the first four months of 1949 were $34,395,000 compared with $45,774,000 for the same period in 1948. These developments included new construction, expansion of industrial buildings, and the purchase of land and buildings for industrial purposes.

Cargill, Inc., Minneapolis, grain elevator operator, will construct a large grain elevator along the Illinois Waterway near Lockport. The elevator will be one of the largest in the Middle West.

Borden Company has purchased the 120,000 square foot building at 1801 S. Kilbourn avenue. The plant will be used for icecream making and cheese processing.

Reynolds Electric Company, 2650 W. Congress street, is constructing a plant at 3000 River Road, River Grove, Ill.

Storkline Furniture Company has purchased the 50,000 square foot plant adjacent to its principal plant at 26th and Kostner avenue.

Mills Envelope Company, 538 S. Wells street, has purchased the building at 2403 N. Oakley avenue. The company will establish its headquarters in this building which contains 40,000 square feet of floor space.

Garland Manufacturing Company, Detroit, Mich., manufacturer of automotive and farm machinery parts, has purchased a building in Chicago Heights. The building, which contains 20,000 square feet of space, will be operated as a branch plant.

Humphreys Leather Goods Company, 645 N. St. Clair street, manufacturer of leather novelties, has purchased the one-story factory containing 18,000 square feet at 3620 N. Kilbourn avenue. Bowes Realty Company, broker.

Triangle Beverage Company, 7053 S. South Chicago avenue, is constructing a 12,500 square foot plant at 4841 S. Cottage Grove avenue.

Stattin Brothers Furniture Company, 2127 W. Ogden avenue, is constructing a plant at Rockwell street and 37th place. Emil L. Larsen, architect.

Marshall Steel Company, Lisle, Ill., is constructing a 12,000 square foot plant in McCook. The company produces precision ground flat tool steel.

Weber Food Products Company, a newly organized company, has started construction of a plant at 5235 N. Avondale avenue.

Martin and Company, 105 W. Wacker drive, manufacturer of rubber stamps and marking devices, has purchased the one-story brick and steel building at 4445 N. Ravenswood avenue.

Sheridan Manufacturing Company, newly organized company, will manufacture women's house dresses in a plant in Waukegan.

Central Chemical Division of Wilson and Company, Inc., is expanding its plant in Calumet City, Ill.

Arthur Drymalski, producer of special metal products, has constructed a plant at 1320 W. North avenue.

Matchless Metal Polish Company, 840 W. 49th place, is constructing an addition to its plant. C. W. Marshall, architect.

A & H Printing Company, 3163 N. Clark street, is constructing a plant at 2438 W. Irving Park road.

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newly organized company, has purchased a plant in Summit, Ill., in which it will manufacture gears, pulleys, and special machine parts for engines.

Langson Manufacturing Company, 4200 W. Wrightwood avenue, is constructing a plant at 5686 Northwest highway. The structure will contain approximately 10,00 square feet.

Gary Screw and Bolt Compan Gary, Ind., is constructing a 10,00 square foot addition to its plant.

Super Sensitive Musical Strin Company, 1529 N. Milwaukee av nue, is constructing a plant at 481 W. Division street.

Research On A Small Budget

(Continued from page 20)

prises are big and growing bigger, partly, at least, because they realize the value of industrial research.

Research, of course, does not come cheap. One survey shows that in eleven top companies, the investment for buildings, facilities, and equipment averages $6,000 for each research employe and the total cost per worker is at least $11,000 a year. At these prices, few small companies can afford a formal research department. Fortunately, however, there are other means by which a small concern can undertake research at a reasonable cost.

Testifying before a congressional committee, Ralph E. Flanders, then president of Jones and Lamson and now Senator from Vermont, outlined one solution. His firm, he declared, has maintained its position in industry by hiring "bright young fellows."

How System Works

The "bright young fellow" approach works this way: first, a capable individual must be entrusted with company research. He may be assisted by several full-time subordinates and by part-time help from plant personnel. It was in this manner that the General Electric Laboratory was started, the "bright young fellow," in this instance, being William R. Whitney.

The degree to which a one-man laboratory benefits a small company depends heavily on the calibre of the research director. Frequently, university teachers can be hired on a part-time basis to fill the "bright young fellow" role. It was two university professors, for example, who synthesized quinine and quinidine for the Polaroid Corporation. Inventive genius really has no restriction, however. Many firms have found inventive genius right at home. Suggestion systems have frequently turned up excellent r search hands.

A second major source for sma company research is the individua inventor. Until 50 years ago all inventions were produced by suc individuals and to them must g credit for the great industrial progress of America in the Nineteenth Century. Although the trend in recent years has been toward the formal industrial research organization, the individual inventor is still a tremendously important factor.

Individual Contributions

Vannevar Bush, former directo of the Office of Scientific Research and Development, said recently tha many commercial innovations hav been "produced not by group worl but simply by reason of the fac that there are individuals who hav the keenness of analysis to enabl them to see long before anyone els a need, and to put together a combination or device which will satisfy it." Actually, more than half the inventions in use today came from independent inventors.

There are still other sources fo small company research. The U. S Chamber of Commerce estimate that 25 to 30 per cent of all technical research is sponsored by industry groups, trade associations, anc engineering societies. Studies show that at least 30 industry group maintain their own research anc testing laboratories, ranging from the three-man staff of the America Butter Institute to the 171-man staf employed by Underwriters' Laboratories, Inc.

Hundreds of other association conduct research through government bureaus and in colleges anc universities. The Sugar Research Foundation recently allocated $705,000 to more than 40 universitie hospitals, and others for explorator studies seeking new uses for suga

This work has already resulted in he use of sugar in the manufacture of hair tonic, shoe polish, adhesives, explosives, photographic material, plastics, welding rods, and leather. In another case, Bituminous Coal Research, Inc., is spending over $1,000,000 for the development of coal-gas burning techniques for railroad locomotives.

On a smaller scale, outstanding research work has been accomplished by the Wet Ground Mica Association, although the association's five members have an average annual volume of only $500,000. With $2,500 available for cooperative research, the association has created national interest in the use of waterground mica as a component in oil paint. As a result, a thoroughly sick industry, its major markets in the rubber field and for wallpaper finishes taken away by substitute materials, is now thriving again, thanks to cooperative research.

Trade Association Work

In 1947, sixteen national trade associations, representing thousands of large and small businesses, worked with federal scientists at the National Bureau of Standards. With researchers from the American Dental Association the bureau developed improved dental inlays and metal tooth fillings, and with personnel from the Vitrified China Association it improved vitrified chinaware. The bureau has provided the National Radio Relay League with means of reducing static; the Laundry Owners Association with better means of washing clothes, and the American Society of Heating and Ventilating Engineers with improved ventilating systems.

Trade association research is concerned, of course, only indirectly with the problems of specific company members. For the solution of specialized problems, requiring extensive laboratory equipment and trained specialists, many concerns turn to the non-profit, tax-free research foundation. Among these are the Armour Research Foundation, the Battelle Memorial Institute, Midwest Research Institute, Mellon Institute of Industrial Research, and the Southern Research Institute. These organizations provide research facilities for smaller companies which do not have re-

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search organizations of their ow and also supplement the researc laboratories of larger companie Such industry-sponsored studi were valued at over $10,000,000 i 1946 and are still increasing i scope.

The variety of this research ca be seen from this partial list c projects under investigation in 194 at the Armour Research Foundation: development of voltage regulators for Eastman Kodak, improvement of graphite crucibles for th Vesuvius Crucible Company, studie on filtration for the Cuno Eng neering Corporation and researc into new organic, dielectric sub stances for the Line Material Company.

Universities Help

Small concerns seeking closer-to home research sources need go n further than their neighboring un versity. For $320 the University o Louisville did research on paint an varnish chemistry for a group of local manufacturers. A $600 fee covered the cost of investigating ointment bases at Purdue University.

As many small concerns have discovered, the federal government i an important research aid. The U. S. Bureau of Mines recently perfected a microprojector costing les than $45 and made the new produc available to industry. A peanut digger is but one of the many type of farm equipment produced by th Agricultural Research Foundation Testing of products as a service t industry is being done by the U. S Public Health Service, the Burea of Mines, the Bureau of Standards the Department of Agriculture, th Food and Drug Administration, an many other federal agencies.

Hundreds of small firms have als received valuable assistance fron private consultants, commercial research and testing laboratories, an even certain hospitals. Although th commercial laboratory serves bot large and small industry, it ca adapt its research work to the specific requirements of virtually an manufacturer. Taken together these numerous research agencie are making possible the fruition o Dr. Land's prophesy that tomo row's small company will be a research organization as well as a man ufacturing organization.

If not, it may soon be neither.

TRANSPORTATION and TRAFFIC

☆

LEGISLATION establishing a uniform time limitation period of two years for recovery of undercharges and overcharges by or against motor carriers, water carriers and freight forwarders will more than likely be enacted before the adjournment of Congress. Passage of such legislation has long been advocated by both shippers and carriers. The major obstacle to enactment was hurdled on April 11 when the Senate passed S. 257 without debate or objections. The bill now awaits action in the House. Similar legislation was passed overwhelmingly by the House during the last session of Congress, but was not acted on by the Senate. Hearings by a subcommittee of the House Interstate and Foreign Commerce Committee on a companion bill, H.R. 1709, have concluded and a favorable committee report is expected shortly. Statements urging early passage of the legislation were submitted to the committee by The Chicago Association of Commerce and Industry and The National Industrial Traffic League. The association's statement pointed out that the need for enactment of such legislation was more urgent now than at any time previously because of the discrimination against shippers which has arisen during the past two years due to the action of certain carriers, particularly motor carriers, in publishing tariff rules providing a two year time limitation period for collection of overcharges against carriers without providing a like limitation period for recovery of undercharges against shippers when less than the published tariff rate was paid at time of delivery.

O.D.T. Loading Orders to be Vacated: The last of the Office of Defense Transportation's wartime loading orders will be revoked on June 30. This is also the scheduled date for the discontinuance of the O.D.T. Meanwhile, the previously announced suspension of General Order O.D.T. 18-A, Revised, which relates to the heavy loading of carload freight, will be continued in effect. General Order O.D.T. 1, Revised, which relates to the loading of merchandise (L.C.L.) freight was suspended from April 16 to June 30 on which date it will be revoked. General Order O.D.T. 16-C, Revised, which restricted the movement of carload shipments of "overseas" freight moving to or within port areas, was revoked effective 11:59 p.m., April 16. Colonel J. Monroe Johnson, director of the Office of Defense Transportation, stated that the suspension and revocation of the orders was made possible due to the continued decline in carloadings. He pointed out, however, that there is reason to believe that there may be a tight situation with respect to high class box cars as the movement of grain increases and warns that if necessary Orders 1 and 18 will be reimposed before June 30. The Interstate Commerce Commission has also vacated their Service Order No. 68, effective April 16. This order suspended Classification Rule 24 and that portion of Rule 34 which permits application of minimum weights lower than those provided for the car used. The Association of American Railroads has cancelled their export embargoes No. 50-C, 50-C-3 and 50-C-20, effective with the revocation of O.D.T. Order 16-C, Revised, on April 16.

Petition for Further Hearing in No. 29770 Accepted: The petition of Official territory railroads for leave to file petition for further hearing in Docket No. 29770, Increased Less Carload Rates in Official Territory, has been accepted

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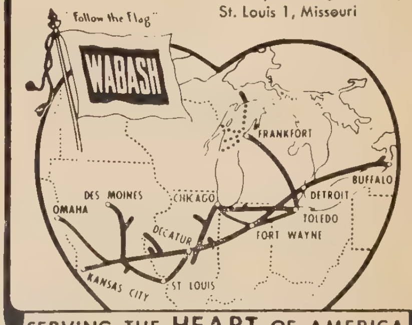

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by the Interstate Commerce Com mission. The carriers intend present a modified and alternati proposal of rates for applicati on less-than-carload traffic in off cial territory. The former pr poses to increase the present fiv mile rates by 105 per cent c exception rated traffic and by per cent on classification rated tra fic. The percentage of increas will decrease with the length haul for distances under 700 mile For distances of 700 miles or mor the rates on exception rated traff would be increased to the presen classification basis and the class fication basis would remain un changed. The alternative pla proposes to apply the present class fication basis of rates on all les than-carload traffic. Both pro posals provide for: one, a min mum charge based on 100 pound at the first class rate, but not les than $2.25 per shipment; two, minimum rate of $1.00 per 10 pounds when pick-up and/or de livery service is performed; and three, a minimum weight per pack age of 25 pounds. The origina Docket No. 29770 scale of less ca load rates was rejected by th I.C.C. last October.

Nomination of Cross to I.C.C Confirmed by Senate: The nomina tion of Hugh W. Cross of Illinoi as a member of the Interstate Com merce Commission has been con firmed by the Senate. He assume his duties on April 13. The Sen ate also confirmed the renomina tion of Oswald Ryan as a membe of the Civil Aeronautics Board. The new I.C.C. member is a residen of Jerseyville, Ill., and was forme lieutenant governor of Illinois. Hi nomination to the commission is t fill the vacancy caused by the death of Commissioner George M. Bar nard.

Recommend Liquidation of Federal Barge Lines: Immediate liqui dation of the Inland Waterway Corporation, operators of the Federal Barge Lines, has been rec ommended by the Commission o Organization of the Executiv Branch of the Government in thei report on "Federal Business Enter prises". The commission, usuall referred to as the Hoover Commis sion, in their report states: "Fo 23 years, the company (Inlan Waterways Corporation) has bee operated at an almost continua loss and, as of June 30, 1947, showed an accumulated deficit of $8,192,104 from operations and insufficient depreciation reserves. The fleet is obsolete and it is estimated that about $18,000,000 would be required for rehabilitation. Private enterprise now serves this transportation purpose, as indicated by the fact that the company carried about 3,000,000 tons out of a total of over 40,000,000 tons on the rivers it serves."

Trends In Finance and Business

(Continued from page 10)

he had to work 153 hours for the same outfit. On the female side, the 1948 worker whose wife bought a hat worked an hour and a half on the average to pay for it. A third of a century ago his father would have had to labor four hours to buy the same bonnet.

A further finding of the survey is that family expenditures for heavy clothing has declined noticeably since 1914. The reasons are more or less obvious: homes are better heated; outdoor travel has given way to enclosed vehicle transportation; and high, heavy shoes have been replaced by oxfords.

« « » »

Fewer Autos Are Reaching Scrap Piles

Despite the increased production of new automobiles, decidedly fewer people are scrapping older models than at any time in recent years. A survey by R. L. Polk and Company shows that for every four cars sold in 1948, only one old one was discarded. Before the war, two cars were being junked for every four new ones sold.

The total of 855,517 passenger cars not re-registered in 1948 was up 75 per cent over 1947, but this figure was still far below the mid-depression high of 2,828,566 reached in 1932, when total registrations were also considerably lower. The average yearly scrappage since 1925 has been 1,617,853, for a total of 38,828,471 by the end of 1948. Had there been no scrappage between 1925 and 1948, there would be over 70,000,000 cars in use today, compared with the estimated actual figure of 31,789,000.

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New Products

Plastic Mailbox

The Rogers Plastic Corporation, North Wilbraham, Mass., has extended the use of synthetics with the introduction of plastic mailboxes in a variety of two-tone color schemes. The modernistic boxes are non-staining and non-rusting, according to the company, and their transparent lower section allows mail to be seen without opening the box.

Aluminum-Base Paints

New paints, incorporating an aluminum pigment developed by Reynolds Metals Company, Louisville, Ky., have been introduced by several manufacturers who say the paints provide positive protection against mold and rot when applied to wood and other organic surfaces. The paints utilize a base of aluminum particles, said to make them mold- and rot-repellent even when used on marine pilings, ships, boats and bath houses.

Plastic Binding Machine

One problem in the use of multi-colored plastic bindings for catalogs, sales literature and the like is the substantial cost of heavy plastic binding equipment. Now, however, the General Binding Corporation, 816 W. Belmont Avenue, Chicago 14, has a portable binding machine which it says will greatly reduce the cost of applying plastic bindings. The machine is a table model and handles loose sheets of virtually any size.

Water Pipe Tape

That old home owner's headache, "sweating" cold water pipes, may be more simply conquered with a pliable, cork-filled tape introduced by the J. W. Mortell Company, Kankakee, Ill. The new "NoDrip" tape winds spirally around pipes, requires no tools, adhesive or brads, and can be painted any color with cold water paint.

Portable Hardness Tester

The American Machine and Metals Company has brought out a portable hardness-tester which simplifies the checking of heavy metal pieces that can't be measured conveniently with a bench-type teste The portable tester uses either di mond or steel-ball indentors make a saucer-like impressio which is then checked against hardness scale. The machine ha dles material up to five inches i diameter, five inches thick, and made by American's Riehle Testin Machines Division, E. Moline, Ill.

Smoke Indicator Alarm

Low-cost smoke control is pr vided by a new photoelectric ind cator alarm developed by De-Te Tronic Laboratories, Inc., 1227 N Clark Street, Chicago 10. Phot electric cells check the smoke de sity passing through the flue of boiler and signals when the densit exceeds a predetermined level, thu insuring against imperfect combu tion or smoke output in excess o local smoke ordinances. A 3-secon delaying action is provided to pr vent short puffs of smoke from setting off false alarms.

Fire Detector

Another new mechanism, utili ing a similar photoelectric arrange ment to spot storage and warehous fires that smoulder for some tim before setting off regular heat-ac tivated alarms, has been introduce by Walter Kidde and Company Inc., 675 Main Street, Belleville N. J. This device sucks samples o air into an analyzer tube, filters i to remove dust and dirt, the passes the sample through a photo electric light beam. Since smok reduces the amount of light reach ing the photoelectric cells, i touches off the alarm irrespective o the amount of heat generated b the smouldering fire.

"Wireless Newspaper"

A further step in the develop ment of "newspapers by radio" i marked by the introduction of "display" facsimile receiver for us in department stores, hotel lobbie and other public places. Develope by Stewart-Warner Corporation 1826 Diversey Parkway, Chicago 14 the new unit receives sound o facsimile programs of news, fea tures and advertising on a regula schedule. Facsimile "printing" ap pears in a tamper-proof, unattended cabinet to be sold or leased by transmitting stations or publishers.

Flexible Fish Tape

Ideal Industries, Inc., 1813 Park Avenue, Sycamore, Ill., has introduced a new fish tape, called "Coil-Flex," which the company says can be easily pushed or pulled through any conduit bends allowed by the electrical code. Since the surface is rounded, the tape can be used in all types of conduit, including aluminum, without catching or snagging. "Coil-Flex" can be rolled into a 10-inch diameter circle.

Here, There and Everywhere

(Continued from page 8)

Cleveland area. They are Washington's and Lincoln's birthdays, election day, Good Friday, and Franklin Roosevelt's birthday.

- **Penicillin Price Down** — Penicillin users can now get eight vials of the "wonder drug" for the price they paid in 1945 for one vial, according to Schenley Laboratories, Inc., which adds that increasing efficiency in mass production of the antibiotic has made posible 22 price reductions since penicillin became generally available.

- **The Hard Truth** — At last, the Monsanto Chemical Company has let the cat out of the bag: the sweetness of a kiss is due, at least in some small part, to modern chemistry. The reason is the use of powdered saccharin, a powerful sweetening agent, in most lipsticks. Monsanto adds that only a small dose, perhaps only 1/200 of a gram — is used in each lipstick, but even this much is enough to put a sugary sweetness into the osculatory greeting.

- **Disgruntled Car Owner** — The California Superior Court has held that a dissatisfied car owner may be enjoined from plastering a car with signs disparaging it and its manufacturer and parking it near a dealer's display room. The court held that the purpose of the car owner was not purely altruistic but was intended to curtail the business of the dealer "with the notion" that, as a result, the dealer would be forced to buy the car from its owner.

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As Capital Expenditures Go So Goes Prosperity

(Continued from page 24)

havoc with expenditures for new plant and equipment. That means raising havoc with that key part of our economy engaged in producing capital equipment, and thus producing general prosperity or the lack of it.

How has business managed to get itself so dependent upon profits for money to buy new equipment? Why can't it go out and raise money to buy such things? That is a long and involved story. Honest people are sharply disagreed about key parts of it. It is possible, however, to cut through to somewhere near the heart of the story by citing a couple of what I believe are undisputed facts. At present stock market prices, you can buy the steel producing capacity of the United States at less than 25 cents on the dollar of what it would cost to reproduce it. You can buy many railroads at a similar fraction of what it would cost to reproduce them. The stock market values the facilities of the petroleum refining industry at less than three-fourths of the cost of reproducing it. The common stocks of scores of well established American corporations are being sold on the New York stock exchange today at only five times their 1948 earnings. And you can buy the shares of at least 20 companies at three times their earnings of last year.

Stock Selling Impractical

Under such circumstances great industries of the sort I have mentioned obviously cannot raise money by selling stock at any other than ruinous prices. They usually still have some capacity to go into debt. But that is also one well worn route to bankruptcy. So they look primarily to profits for money with which to buy new plant and equipment.

It is argued that if the corporations would pay out a larger share of their profits in dividends the prices of their stock would go up and their whole credit position would be improved. There is obviously something in this line of argument. A claim to a big dividend is worth more than a claim to a small one. However, there is not enough in the argument. Such scant evidence as is available indicates that shares of industria companies that have followed generous dividend policy haven' fared a great deal better in th stock market than those which hav not. And some companies which have paid out as much as three fourths of their profits in divi dends have still seen their stock selling for five or six times it earnings. Under such circum stances it is the part of prudent corporate management to guard profits closely.

Tax Havoc

I hope that I have demonstrated that taking $3,000,000,000 more in taxes from corporate profits can raise havoc with the badly needed expenditures for new plant and equipment. That in turn can raise havoc with business in general. It also can jeopardize the national security in a world where our very survival depends upon keeping ahead in the struggle for industrial supremacy.

You may, however, be inclined to take the comfortable view that the President is not likely to get much of anywhere. You may accept the widespread opinion that the Truman legislative program is generally washed up.

If you do, I think you will make a great mistake, and one which would be grossly neglectful of your special custodianship of business and industry. One reason is that unless the federal government is going to engage in an utterly reckless course of deficit financing during a period of high employment, it is more than likely to be faced with the necessity of raising more money through taxes.

The other reason is that we have reached a point in this country where there are two methods of taxation which far outstrip all others in political popularity. One is to raise individual income tax rates in the upper brackets, known vulgarly as socking the rich. The other is to tax profits, which are quite commonly regarded as something the boss receives for sitting around with his feet on the desk until they roll in.

Hence, even though they may escape further taxation in the immediate future, profits will obvi-

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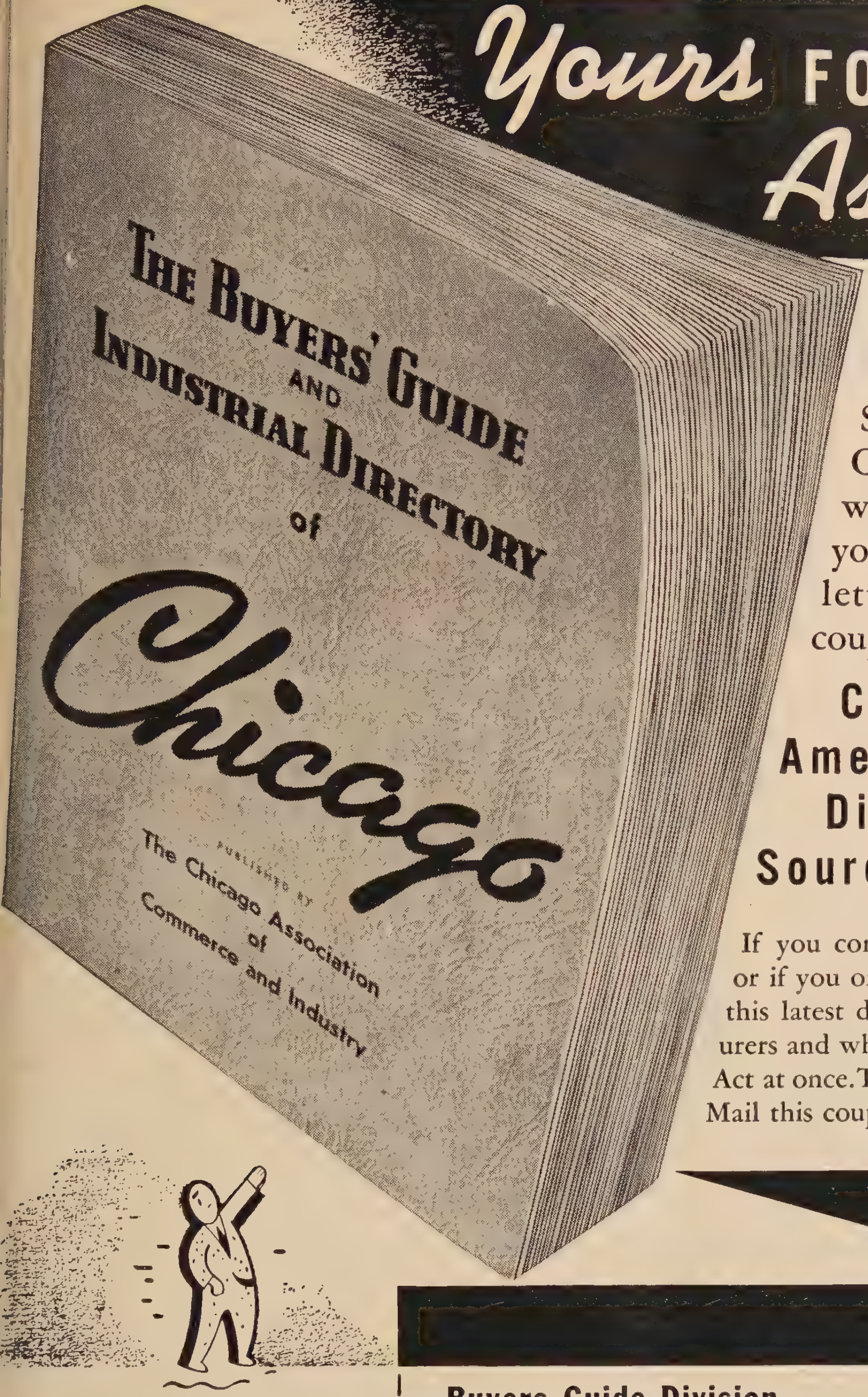

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ously remain a prime target for further taxation unless the political popularity of taxing them is reduced. I haven't the slightest interest in defending profits or any particular level of profits as such. I am interested in profits in terms of what they do to make the economy operate successfully. Their role includes the provision of a great deal of badly needed industrial plant and equipment, and a lot of jobs. Charles Roos, a skilled and careful business analyst, estimated in January when the corporate profit tax increase was proposed by the President that if passed by Congress it "would take jobs from about 2,000,000 people" by cutting down expenditures for new plants and equipment.

Ways of Correction

Well, is there anything that can be done to improve the drab outlook for capital equipment? I think there is. But I am also sure that getting anything effective done is going to be an extremely tough job.

As I sense the situation in our country the great mass of the people have a feeling that a relatively small crowd of "fat cats" is getting all the best of it, and that the government should divvy things up much more evenly. This feeling is fostered by a lot of exciting advertising about glamorous things and places reserved for big business executives and the rich. So far as I can tell what is principally reserved for the business executive these days is a fine collection of stomach ulcers and an early grave. But so long as there is the mass feeling of jealousy which I sense, it will be extremely difficult to handle a problem such as that of capital investment intelligently. And in an extremely complicated society such as ours has become it is a rather easy feeling to keep stirred up.

When it comes to the facts about capital investment, as opposed to the mythology, one of the most important facts is that we have had a revolution in income distribution during recent years. It has put millions of farmers and industrial workers in a financial position to make a direct investment in American industry. Many of them also have the inclination to take the necessary risk. That is demonstrated by the tremendous business done in betting at the race tracks, the bingo games — which I find are frequently sponsored by churches — and the numbers players.

As a student, in contrast to a practitioner, I recently studied the flow of activity at the parimutual betting booths at the race tracks and that on the New York Stock Exchange. I made the startling discovery that between 1929 and 1946 parimutual betting at the same race tracks had increased by 2,400 per cent, and amounted to over $2,000,000,000 in 1946. Over the same period activity on the stock exchange had decreased by 67 per cent.

This study prompted me to suggest that if we are going to solve this problem of capital equipment on satisfactory terms, the security salesmen must devise a sort of $2 window where you can place a bet on your favorite industry. At any rate something of the sort must be created if we are going to have a good chance to solve the problem of capital equipment satisfactorily.

Education Needed

Another much more important, and more difficult thing to do is to create some popular understanding of the economics of capital investment. For example, the New Deal obviously won the hearts of most of the American people, perhaps primarily, by promises (I believe sincere promises) to provide greater and more general social and economic welfare. However, the New Deal never even made a creditable start toward getting the production necessary to fulfill those promises over any length of time. It took a world war to get things moving. Why? The answer, I am sure, is that the New Deal never grasped the crucial role of the capital goods industries. It concentrated on consumer purchasing power and neglected the capital goods industries.

If you go to Washington you will find that the set of ideas which made a great political success and a great economic flop of the New Deal still strongly persists. Along with it you will find another idea which, if anything, seems to me even better calculated to raise havoc with capital investment and hence with the progress, prosperity and even the safety of the nation.

That idea is that if it develops you need more investment in industrial plant and equipment, investment by the federal government is just as good as private investment. Put another way, the idea is that a dollar of investment is a dollar of investment regardless of where it comes from. It is this idea which, so far as I can tell, makes many people think that a measure such as the Spence Bill, which authorizes the government to build plants and equipment in any industry where more capacity is needed, is a good type of insurance that we will have enough plant and equipment.

I am sure, however, that the fact is it would be hard to think of a better way to put a blight on private investment in new plant and equipment for industry generally than to get the federal government working down the same street. Such an arrangement would, I am sure, frighten so much private investment out of the field that the federal government could not replace it without socializing large chunks of American industry and creating a great deal of economic confusion and distress in the process.

Personally I am extremely anxious not to see this happen. I doubt that this is because of any selfish material motives. My financial stake in our more or less capitalistic system is quite small. I

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am confident that I would have wit enough to get along well enough in economic terms in socialistic set-up. Every time there has been a national crisis in my adult life (there have been quite a few) I have found myself working for the government. I have never had any complaint about the wages.

Why I don't want to see the government take over large chunks of industry is that I am confident that it would take over large chunks of my personal freedom with them. Perhaps the British can socialize their industry and keep Britain as a place where one says whatever one pleases about anything. I doubt it. But I am completely confident that we cannot concentrate control of industry in Washington and keep our personal freedom anywhere near intact. That is not a purely theoretical view. It is based upon quite a lot of close up observation of the power-hungry people who are attracted to Washington. Many of them are also willing to be completely ruthless in the use of any power they can grab.

Avoid Power Concentration

I want to keep too much power away from them, just as I want to keep too much power from being concentrated in any single corporation or union. It is poison for all of us, including the people who get the power. To my mind Lord Acton proclaimed a profound truth about the human race when he observed that "all power tends to corrupt, absolute power corrupts absolutely."

I have talked mostly about such mundane matters as plant, equipment and profits and taxes. I don't apologize. They are very important. But what is vastly more important is our freedom and dignity as human beings. And that, as I see it, is very much at stake in our handling of this problem of capital investment. If we, I should say you, handle it wisely, you have at least a chance of passing on to your children fairly well intact what is by all odds their greatest heritage, their personal freedom. If you bungle the problem, your children may still be fat but I don't think they will be free. So please make a mighty effort not to have it bungled.

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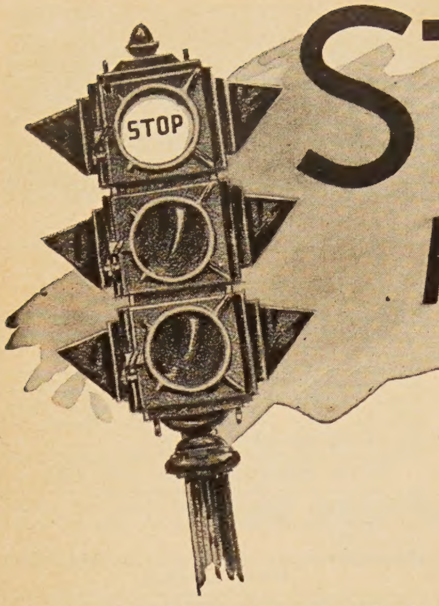

STOP ME-IF—

On his way home, Clancy stopped off at the post office to mail a letter to his fiance, but the three-slots, "City," "Domestic" and "Foreign" perplexed him.

"Faith, and this is a fine problem," he exclaimed. "Maggie's a domestic, she lives in the city, and she's a foreigner. What beats me, is how I'm going to get this letter in three holes at wanst!"

* * *

A small boy showed up at the doctor's office. He had a note from his mother. The note read: "Dear Doctor: Please, will you do something to Willie's face. He's had it for a long time and it's spreading."

* * *

"Mother, are you the nearest relative I have?"

"Yes, dear, and your father is the closest."

* * *

"It was the Atomic Theory class, and the instructor of the physics class wrote down an equation on the blackboard and stated that a certain number of electrons were involved. From this he developed an entire board of equations, winding up at the bottom with, "So you see we have five less equations than at the start. What became of them?"

Not a sound from the class. Imperatively the instructor asked again, "Gentlemen, where are those electrons?"

It was time for action and from a rear seat came a gruff command: "Don't nobody leave this room."

* * *

When a teacher asked for a sentence containing the word diadem, she got this reply:

"People who drive over busy railroad crossings without looking, diadem sight quicker than those who stop, look and listen."

* * *

An American woman visiting in Paris before the war went to a bureau which provided men as escorts. When informed that she could engage either a Northerner or Southerner, she asked the difference, and was told that the Southerners were gallant and debonair, while the Northerners were smooth talkers and romantic.

"Well, then," she said, "I'll take a Southerner from as far north as possible."

"I'm sorry, madam," said the attendant at the movie, "but you can't take that dog into the theater."

"How absurd," protested the woman. "What harm can pictures do a little dog like this?"

* * *

The teacher sent this note home to a young student's father: "Your son displays serious signs of astigmatism. I hope you will take steps to correct his difficulty."

Next morning the teacher got a note which read . . . "Dear Teacher: I have walloped him good and you can wallop him some more. If that don't help, let me know, and I'll beat the daylights out of him."

* * *

When the owner of a timber tract sent out a camp crew of 50 men with three women to cook for them, he said to the camp boss:

"Don't give me long reports about what you are doing. Instead of multiplying words, just give a few figures each week and I can tell how you are getting along."

The next week he received this note: "2% of the men have married 33 1/3% of the women."

A London housemaid gave notice because she was going to be married. But when the great day arrived, it was found that her successor could not take up her position for another fortnight. Her mistress asked her if she would not postpone the ceremony.

"Change the date, change your fate, ma'am," the girl answered. "It's like flying in the face of Providence to alter wedding arrangements; but if 'Erbert is agreeable, I don't mind getting married and then coming back for a fortnight."

The young man was amenable to this arrangement, and half an hour after the ceremony the bride was back at her usual duties.

"And has your husband gone back to work, too, Mary?" asked her mistress.

"Oh, no, ma'am," was the shocked reply. " 'Erbert wouldn't work on a great day like this! 'Erbert's gone to 'Astings on his honeymoon."

* * *

"Jane, I wish you wouldn't talk that way about my boy friend. I'll admit Al hasn't a job, has no money and no future, but there's a reason for that."

"What's the reason?"

"He says he doesn't want to be obligated to anyone!"

* * *

"Hey, what are you doing?" yelled the foreman.

"I'm just sharpening a pencil," answered the bricklayer.

"Well, don't let anybody see you. That's a carpenter's job, you know."

* * *

An accused criminal looked up at Lord Bacon, who as chancellor, was trying his case.

"Your highness really ought to let me free. We're kin, you know, for my name's Hogg and Hogg's kin to Bacon."

Dryly Bacon replied, "Not until it's hung!"

"If my wife hints at a $50 increase for me, Mr. Crumpack, don't take it seriously —she'd be tickled with just $25."